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SYSTEM

OF

SURGERY:

BY

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CONTENTS.

CHAPTER XIV.

Page

DISEASES *of the* MOUTH, - 9

Sect. IX. *Of Toothach,* - ib.

§ 1. *Of Toothach from the Nerve being laid bare, and of the various Methods of Extracting Teeth,* 11

§ 2. *Of Toothach from Inflammation,* 62

§ 3. *Of Toothach arising from Affections of distant Parts,* - 68

Sect. X. *Of Transplanting Teeth,* 73

Sect.

Page

Sect. XI. *Of the Ranula*, - 85

Sect. XII. *Of Ulcers of the Mouth and Tongue, and Extirpation of the Tongue*, - - 90

Sect. XIII. *Of the Division of the Frænum Linguæ*, - - 97

Sect. XIV. *Of the Division of the Parotid Duct*, - - 99

CHAPTER XV.

Of the DISEASES *of the* EARS, *and the* OPERATIONS *practised upon them*, 103

Sect. I. *Of Deafness*, - - ib.

§ 1. *Of an Imperforated Meatus Auditorius*, - - 107

§ 2. *Of Extraneous Bodies impacted in the Ear*, - - 109

§ 3.

Page

§ 3. *Of Excrescences in the Meatus Auditorius*, - - 112

§ 4. *Of Deafness from Wax collected in the Ears*, - 116

Sect. II. *Of Perforating the Lobes of the Ears*, - - 123

CHAPTER XVI.

Of the Wry Neck, . - - 126

CHAPTER XVII.

Of Bronchotomy, - - 131

CHAPTER XVIII.

Of Oesophagotomy, - - 150

CHAPTER XIX.

Of Diseases *of the* Nipples, - 162

CHAP-

Page

CHAPTER XX.

Of the Amputation *of* Cancerous Mammæ, - - 166

CHAPTER XXI.

Of the Paracentesis *of the* Thorax, 188

Sect. I. *General Remarks on the Operation,* - - - ib.

Sect. II. *Of Serum collected in the Thorax,* - - 190

Sect. III. *Of Blood collected in the Thorax,* - - 208

Sect. IV. *Of an Empyema, or a Collection of Purulent Matter in the Thorax,* - - 215

Sect. V. *Of Air extravasated in the Thorax,* - - 225

CHAP-

Page

CHAPTER XXII.

Of the PARACENTESIS *of the* ABDOMEN, 234

CHAPTER XXIII.

Of HERNIÆ, - - 251

Sect. I. *Of Herniæ in General,* ib.

Sect. II. *Of the Bubonocele,* - 306

Sect. III. *Of the Hernia Congenita,* 346

Sect. IV. *Of the Crural or Femoral Hernia,* - - 350

Sect. V. *Of the Exomphalos, or Umbilical Rupture,* - - 360

Sect. VI. *Of Ventral Herniæ,* 366

Sect. VII. *Of the Hernia of the Foramen Ovale,* - - 368

Sect. VIII. *Of the Hernia Cystica, or Hernia of the Urinary Bladder,* 372

CHAP-

Page

CHAPTER XXIV.

On the HYDROCELE, - - 378

Sect. I. *General Remarks on the Hydrocele,* - - ib.

Sect. II. *Of the Anasarcous Hydrocele of the Scrotum,* - - 387

Sect. III. *Of the Hydrocele of the Tunica Vaginalis Testis,* - 402

Sect. IV. *Of the Hydrocele of the Hernial Sac,* - - 502

Sect. V. *Of the Anasarcous Hydrocele of the Spermatic Cord,* - 510

Sect. VI. *Of the Encysted Hydrocele of the Spermatic Cord,* - 515

CHAPTER XXV.

On the HÆMATOCELE, - 528

ARRANGE-

A

SYSTEM

OF

SURGERY.

CHAPTER XIV.

Diseases of the MOUTH.

SECTION IX.

Of Toothach.

TOOTHACH appears to be more unsupportable than any other kind of pain. It renders all who labour under it very unhappy; and being one of the most frequent diseases to which the human body is

is liable, it necessarily becomes a frequent object of attention.

The pain induced by toochach, even when confined to a single tooth, is often productive of severe distress; but this is trifling when compared with the consequences that sometimes ensue from it. Instances, indeed, often occur of the most robust constitutions being ruined by frequent returns of it. Besides the usual symptoms of pain in one or more of the teeth, and of swelling in the contiguous gums, the cheek frequently swells to a large size; the eye, and even the ear of the affected side, are often attacked with pain and inflammation; and to these, fever, with all its consequences, is apt to succeed.

These symptoms may be induced by different causes, and by affections of the teeth seemingly of opposite natures.

1. They may proceed from the nerve and other parts within the cavity of a tooth being denuded, either by external violence,

violence, or by the enamel falling off as the effect of other diseases.

2. They may proceed from inflammation, either of the parts within the tooth, or of the membrane that surrounds the root of it. And,

3. The teeth and contiguous parts of the jaws are often attacked with pain in consequence of what is usually termed Sympathy; that is, they often become pained from affections of distant parts, very severe fits of toothach being sometimes induced by diseases of the eye, of the ear, and stomach. I shall proceed to treat separately of these causes in the order they are here mentioned.

§ 1. *Of Toothach from the Nerve being laid bare, and of the Various Methods of extracting Teeth.*

In whatever manner the cavity of a tooth be exposed, we find from daily observation, that for the most part it excites

much pain; and the reason is obvious. Nature, as we have already observed, has provided the teeth with nerves, but at the same time she has given them a very complete covering of bone: When this protection, therefore, is destroyed, either by accident or disease, it might à priori be imagined, that these parts which were not formed for being exposed, would suffer various injuries, not merely from the action of food and drink in passing over them, but from the external air being at all times freely applied to them.

But it is not the mere exposure of a nerve, or the violence employed in laying it bare, that produces pain; it is the consequence of this exposure, the effects that result from it, from which all the ensuing distress originates: Of this every practitioner must have met with frequent instances. Thus I have often known the cavity of a tooth laid open by the enamel being broken by a fall or a blow, and no inconvenience ensue but a slight degree of pain; and it frequently happens, that the

enamel

enamel breaks off, and the rest of the teeth moulder away without any pain being produced: It is therefore evident, that exposure of the nerve alone is not the ultimate cause of toothach. It is a certain degree of irritability induced by this exposure that appears to be the cause of it; and to this our views should be directed in the method of cure.

This irritable state of the nerve may be induced by various causes, and more especially by saccharine, acid, and other stimulating substances contained in food, being frequently applied to it;—by the too frequent use of toothpicks, which may often be traced as the origin of toothach;—and by much exposure to a stream of cold air. Exposure to cold, particularly in a damp state of the air, often terminates in toothach by inducing inflammation; but it frequently excites very severe degrees of pain in teeth already deprived of part of their enamel, when no other symptom of inflammation is discovered.

These are the most common causes of toothach when the nerve of a tooth has previously been laid bare; and in such circumstances their mode of operating may be easily explained; but we cannot so easily suggest a reason for this state of a tooth being such a frequent occurrence, nor does it appear in what manner it is for the most part produced. The enamel is sometimes broken by falls and blows, and it frequently suffers by attempts to break nuts and other hard substances with the teeth: In such cases the cause is obvious; for we know by daily observation, that the osseous part of a tooth very soon becomes carious, and wastes away on the enamel being destroyed. But how do we account for the most frequent of all causes of toothach, the decay or wasting of the enamel by rottenness, when no evident external violence has been done to it? It has been alleged, that we may often trace it to a too free use of acids, and by some it is said that it depends most frequently upon a want of cleanliness in not

washing

washing or otherwise clearing the mouth of putrescent particles after meals. Particles of food in a state of putrescency, by resting upon the teeth, are supposed to be capable of communicating some degree of their own nature to the enamel; and putrescency being produced even in a single point, the contiguous parts, it is supposed, will become diseased, from the same cause that mortification spreads in other parts of the body.

I will readily admit that a frequent application of acids, even of the mildest kind, will prove hurtful to the enamel; and therefore that they should be avoided; while it is equally clear, that the mouth should be regularly washed after meals, not only for preventing that kind of incrustation upon the teeth that we have already considered, but for preserving a sweetness of breath: It does not, however, appear, that the disease we are now considering, spoiled or carious teeth, depends upon either of these causes. Were it to originate from the too free use of

acids, it ought to effect all the teeth equally, whereas it begins almost in every instance in a small point, or spot, which, in general, extends much more slowly than it probably would do if the disease was produced in this manner. And again, with respect to the effect of any putrescent particles lodging upon the teeth, it is not likely that this disease can be ever induced by them. A piece of meat remaining in the mouth from one meal to another, may acquire some degree of fetor; but it cannot probably in that short period become so highly putrid as to destroy the living principle in those parts with which it comes in contact. It is a point, however, which may be easily determined by experiment; and from the result of some trials that I made for this purpose, there is reason to suppose that the common opinion with respect to it is ill-founded. A tooth newly pulled was put into the centre of a piece of putrid beef, and after remaining in it for eight days, it was as free from putrefac-

tion,

tion, as when first put into it, neither the enamel nor internal parts of the tooth being in any degree injured; and the experiment being repeated with teeth that had been pulled for a considerable time, the result was exactly similar. Now, if this happens with teeth entirely dead, even when totally immersed in highly putrid matter, we may fairly conclude, that a partial application of putrescent particles to teeth still enjoying life and connected with the rest of the body, will not be apt to hurt them: For we know, that in other parts of the body, the vital principle has a considerable effect in resisting putrefaction; and there is no reason to doubt of the teeth being endowed with the same power of self-preservation. But, besides this general argument in support of the opinion, I may remark, that if the common idea on this point was well founded, those parts of the teeth should be most liable to corruption where particles of food are most apt to lodge; while, on the contrary, those parts of them that are

not

not exposed to this, should seldom suffer. Now, every practitioner knows that this is by no means the case; for it must be acknowledged, that one part of a tooth is just as apt to become carious as another. The most likely part for food to rest in is between two teeth; and we allow that the teeth sometimes spoil in these parts, but by no means more frequently than in other parts not so much exposed to this inconvenience.

It does not appear, therefore, that the causes which have been usually imagined to be most productive of carious teeth have much effect, nor do we know of any incidental occurrence from which, in particular, they can be supposed to proceed: From all the observation that I have been able to make, they seem rather to proceed from some general constitutional cause; from some tendency in the system to produce a wasting or decay of this particular part. The cause of this again I shall not pretend to explain; but I think it perhaps equally probable, that this mortification of the

the teeth depends upon some general affection of the system, as that pain in gout originates from general cause or disposition: Instances no doubt occur, of teeth becoming carious evidently from some particular occasional cause, and especially from the enamel being injured by external violence: This, however, is not frequent: It is rarely indeed met with when compared with the frequency of carious teeth; a disease which in most instances begins without any evident cause, and which in general has subsisted for some time before being noticed.

But allowing that the opinion I have offered upon this point were admitted, it may be asked, To what purpose will it tend? Will it suggest any difference in the treatment of the disease? I think it will.—As the pain in toothach creates much impatience, and is with difficulty supported, if the pained tooth is carious, it is in general not only the desire of the patient, but the earnest advice of practitioners, to have it extracted, as being the most

most certain means of obtaining relief. In violent degrees of toothach, when the other remedies usually employed do not succeed, extraction of the diseased tooth ought certainly to be advised; and in such circumstances no person can be more clearly of this opinion than I am; but I am equally clear, that, in common practice, this is carried too far, and that teeth are daily pulled which ought not to be touched. In most instances, the pain is no doubt removed immediately on the diseased tooth being removed; but it commonly happens, that relief obtained in this manner proves only temporary, and that the caries soon fixes upon some other tooth, which soon becomes as much diseased as the first; and this being likewise removed, the disease is apt to proceed from one to another, till scarcely any are left. Of this I have met with many instances, where almost the whole teeth have been successively taken out, one becoming carious soon after another was removed. Nor is there even at last any advantage gained

gained by the practice; for, after all the teeth are taken out, the pain often remains equally severe in the jaw itself.

The frequent occurrence of this tends much to establish the opinion of carious teeth being often a constitutional disease; and it likewise suggests the propriety of extracting teeth less frequently than is commonly advised. As we can never at first be certain whether toothach depends on a general cause or not, it is perhaps right in every case to extract the first, and even the second tooth that becomes diseased, as soon as the fits become frequent and severe: But whenever the disposition is so strongly fixed in the system, that a third or a fourth soon become diseased, the patient should be advised rather to submit to a good deal of distress than to extract any more; and it often happens, when he has resolution to submit to one fit of the toothach, and to wait till it is completely over, that he never afterwards, in this tooth at least, feels any return of it. Cases no doubt occur in which this does

does not happen; but it happens often enough to warrant the propriety of giving it a fair trial in perhaps every inſtance: Even where it fails, no harm is done by the trial; and when it ſucceeds, the advantage gained by it is great. For a conſiderable time I adopted the common practice on this point in its full extent: Every carious tooth attended with pain I adviſed to be pulled; but finding in general that no advantage was derived from it, the reſult being for the moſt part nearly as I have already deſcribed, I was hence induced to depart from it; and now, after a patient has had a tooth or two extracted, if the diſeaſe ſtill continues to return, I never adviſe the practice to be puſhed farther, unleſs when the pain is ſo ſevere as to be unſupportable, which, however, is not often the caſe. By avoiding expoſure to cold during the fit, and by exhibiting doſes of laudanum proportioned to the degree of pain, the diſtreſs produced by it is at laſt in general removed; and by due attention to cleanlineſs, particularly by frequently

frequently washing the mouth with cold water, and, when practicable, by stuffing the opening in the carious tooth so as to prevent the access of air, many have been saved, not only from the pain and distress of pulling teeth that became first affected, but of losing others, which probably would have become carious if the common practice had been followed of extracting all diseased teeth as soon as they become painful.

Having thus endeavoured to show that carious teeth are most frequently produced by some general constitutional cause, I shall now proceed to consider more particularly the means to be employed, not only for preventing, but for removing toothach depending upon this cause.

In cases of carious teeth, it is the prevailing practice to remove the black or mortified spot with a file, in order to prevent it from spreading; but, so far as my observation goes, the practice ought not to be followed; for the diseased part of a tooth can never be removed without exposing

posing those parts that remain to a more free access of air than that to which they were previously liable; and therefore instead of proving useful, I have almost universally seen it do harm. In many, I have known it induce pain where none existed before; and instead of preserving teeth, it frequently seems to have the effect of rendering the remaining sound parts of teeth sooner carious than they might have become if they had not been touched. I therefore do not hesitate to say, that this practice of filing should be exploded; and whoever considers the necessary effect of it, will probably be of the same opinion. It is evident that the part of a tooth already carious cannot be sensible of pain. For what purpose, therefore, should it be removed? While it remains, it serves in some degree to cover and protect the sound parts beneath; while by taking it off, they are left perfectly bare, and apt to be hurt by whatever is taken into the mouth.

When

When, again, as much of the enamel is removed, either by caries or external violence, as to form a cavity in a tooth, we have it frequently in our power to prevent the accession of toothach, by stuffing or stopping up the opening, so as to prevent the air and particles of food from getting access to the nerve. Different substances are employed for this: Such as gum lac, mastich, olibanum, bees-wax, sealing-wax, tin, lead, and gold. When the opening made by the disease is large, and especially when narrow at the bottom, and wider outwardly, mastich and gum lac, or even bees-wax, will sometimes answer, when none of the harder substances will remain in the cavity: But all of these being soft or friable, they are quickly rubbed down in mastication, and require to be frequently renewed; so that some of the metals are preferable when the form of the opening admits of their being employed, which is always the case when the tooth is much scooped out inwardly, with a small hole leading into

it. Gold leaf is ſometimes uſed; but nothing anſwers ſo well as common tin-foil. As much of it ſhould be cut off as will probably be needed; and one end of it being puſhed into the hollow of the tooth with the inſtruments, fig. 6. 7. or 8. Plate XLV., the reſt of it ſhould be gradually preſſed in till the cavity is filled; and this being done, any portion of the tin that remains ſhould be cut off, and the ſurface of the whole made ſmooth by frequent rubbing with the burniſher, fig. 9. of the ſame Plate. But before any attempt is made for ſtopping a tooth, the nerve ſhould be rendered quite inſenſible; for till this is done, the patient will not be able to bear the preſſure which fixing the tin requires. In general the nerve becomes ſufficiently callous, merely by delay: But when this does not anſwer, we may often effect our intention by inſerting daily into the cavity of the tooth a few drops of oil of origanum, thyme, or any other eſſential oil; by which any ſlight degree of irritability in the nerve is

is often removed, so as to admit of pressure being applied to it with freedom.

I have already observed, that neither tin, lead, nor any hard substance, will remain in the hollow of a tooth unless the opening into it is narrow. It has however been proposed, when the opening is of a different form, and when the stuffing cannot be fixed in any other manner, to do it by drilling a small hole through the sides of the tooth; so that when the lead is pressed down, it may be retained by passing a peg of silver, gold or any other metal, from one side of the tooth to the other. In a few cases this may succeed; but it will not answer either where the opening is wide outwardly, or where the sides of the tooth are not firm, as in such circumstances is often the case; for where the external opening is wide, even a peg passed through the centre of the stuffing will not keep it sufficiently firm to prevent some parts of the food from finding access to the parts beneath; and, when the remaining part of the tooth is

thin and brittle, it will be apt to break in making the hole.

When, however, by any of the means that I have mentioned, the hollow of a tooth can be properly ſtopped, it will not only prove the moſt effectual method of preventing frequent returns of toothach, but will have ſome influence in preſerving the remaining part of the tooth. I have known various inſtances of this where carious teeth have been preſerved for a great number of years, without being productive either of pain or any other inconvenience; but this requires the cavity to be completely ſtopped, ſo as to prevent either food, drink, or even air, from finding acceſs.

When a perſon with carious teeth has been liable to frequent fits of toothach, beſides ſtuffing the hollow teeth in the manner I have mentioned, he ſhould attentively avoid expoſure to cold: His head ſhould be kept warm with flannel coverings through the night; and he ſhould live in a dry ſituation. Indeed, a moiſt

moist atmosphere proves so destructive to the teeth, that people living in wet situations find it exceedingly difficult to preserve them; and I have known various instances of frequent returns of toothach being prevented entirely, by the removal of the patient from a damp to a dry situation: Nay this will sometimes succeed when every other means have failed.

By due attention to these means, much may be done in preventing people with carious teeth from suffering so much as they otherwise would do: But, notwithstanding of all our endeavours, teeth in this situation are very apt to become painful, and are often productive of much misery; so that the most effectual method of lessening or removing this is often a very important object.

Some varieties of toochach may be removed by remedies applied to other parts of the body. Thus when pain occurs in a tooth, as it sometimes does, from inflammation first beginning in the ear, it may be more effectually removed by ap-

plying a blister behind the ear than by any other means: Or when a foulness of the stomach is the cause of it, an emetic proves the most effectual remedy. This I shall afterwards consider more particularly; but when toothach proceeds from the nerve of a tooth being laid bare, it will seldom happen that any remedy will answer that is not applied directly to the part itself. Bark, electricity, and a variety of nostrums, are frequently employed; but in this variety of toothach, the only remedies that I have ever known prove useful, are, anodynes, corrosive applications, and extraction of the tooth.

In slight degrees of toothach, the pain is sometimes relieved, or even altogether removed, by applying either opium or laudanum directly to the bare nerve: I have known camphor too prove useful, both by itself and when conjoined with opium; and it sometimes answers in a liquid form, dissolved in spirit of wine, when it does not succeed in any other way: Æther may be likewise mentioned

as

as a remedy in toothach; but as these and other applications of a milder nature do not commonly succeed, we are for the most part obliged to employ others of a more active kind, with a view to destroy the nerve entirely.

A long continued use of any of the strong essential oils will in some cases, as I have already observed, render the nerve callous or somewhat insensible, but they never destroy it so entirely, as to prevent the risk of future returns of toothach. This, however, may be done by remedies of a different kind; by spirit of vitriol or any other concentrated mineral acid; by inserting a bit of lunar caustic into the cavity of the tooth; or by burning the nerve with the actual cautery. But, in using either the lunar caustic or any of the strong acids, much attention is necessary to prevent the contiguous parts from being hurt; for if not inserted with much caution, they are apt to spread and do much harm: The actual cautery may, however, be employed without risk: But

that it may prove effectual, the hot iron muſt be puſhed farther into the hollow of the tooth than patients in general will allow; for if the nerve be not deſtroyed to the very extremity of the root, no advantage will be gained; and this being both tedious and painful, we meet with few that agree to it; but when properly applied, we have it in our power entirely to deſtroy the nerve: It may be done with a piece of ſmall wire made ſharp at the point, or with the inſtrument repreſented in Plate XLV. fig. 8.

It often happens, however, that none of theſe remedies anſwer, either from their not being duly applied, or from practitioners not puſhing them ſo far as they ought to do. In this caſe, when the pain continues violent, we are under the neceſſity of deſtroying the nerve in a different manner, namely, by the extraction of the tooth; and this being done, if the tooth is not much ſpoiled, and if it be not broken in the operation, after the ſocket is cleared of blood, it may be replaced in the

the manner I shall afterwards mention when treating of the method of transplanting teeth. This will not always succeed, especially in the molares; but in the back part of the mouth it is not so necessary as when the incisores or canine teeth are taken out, when it often answers. And when a tooth thus replaced becomes firm, it proves equally useful as before; while, from the total destruction of the nerve, it is not afterwards apt to produce pain. I shall now proceed to consider the method of extracting teeth.

The pulling of teeth being a frequent operation, much pains has been taken to perform it with as much ease as possible; and although it still necessarily gives pain, it is now done both with more ease and safety than it could possibly be in former times, while the instruments employed for it were rude and imperfect.

It is evident that a tooth may be pulled in different directions: It may either be pulled in a perpendicular direction with respect to its roots; or it may be made to

turn

turn upon its axis by depressing the corona or upper part of it, by which the point of the root will be proportionally raised, or a sufficient degree of force may be applied for pushing it out of the socket in a lateral direction.

If these methods of operating were all equally practicable, we would not hesitate to fix the preference: In raising a tooth perpendicularly, much less violence must be done to the contiguous parts than by forcing it out in a lateral direction: For as the roots of the teeth are all firmly fixed in bone, they cannot possibly be pressed out laterally, but with such a force as is sufficient for breaking or bursting open that part of the alveolar process of the jawbone with which they are surrounded; and as this must produce both laceration and contusion of the gums, it is necessarily productive of much pain: But as all the space we can obtain, even by the greatest wideness of the mouth, will not admit proper instruments for moving the teeth in the back part of the mouth in a perpendicular

perpendicular direction, we are for the most part under the necessity of using such as move them laterally. All the incisores and canine teeth may indeed be taken out in a perpendicular direction, and even some of the molares, when they are loose; but when the molares are firmly fixed, no instruments with which we are acquainted will pull them in this manner. Various proposals have been made for this purpose; but although hitherto every attempt has failed, some farther trials may perhaps render our instruments sufficiently perfect for effecting it.

The only instruments of which practitioners in former times were possessed for the extraction of teeth, were different kinds of forceps or tenets, named according to their form, Hawks-bills, Cranes-bills, &c., and different kinds of levers both straight and crooked. These, however, were rudely constructed, and it was with much difficulty that teeth firmly fixed were moved by them. In process of time, therefore, various improvements were

were propoſed on them; but few of theſe being of much importance, it is not neceſſary either to deſcribe them, or to give delineations of them; eſpecially as they may be ſeen in the works of Garengeot, Scultetus, Hildanus, and other writers of the 17th and preceding centuries. All that I mean to do, is to delineate thoſe inſtruments that are approved of by modern practitioners of reputation; to propoſe ſuch improvements upon theſe as by experience have been found to prove uſeful; and to give a detail of the method of uſing them.

For a long time paſt, an inſtrument termed a Key has been almoſt the only one employed in Britain for extracting firm teeth, and it is now very generally uſed in different parts of the Continent. Different forms of it are delineated in Plates XLVI. and LI.

In operating with this inſtrument, if the tooth to be taken out is in the under jaw, the patient ſhould be ſeated in a chair, while his head ſhould be ſupport-

ed

ed by an aſſiſtant behind; but if in the upper jaw, he ſhould be ſeated upon a pillow, with his head turned back, and ſupported upon the knees of the operator, who in this caſe muſt ſtand or ſit behind him, whether the tooth be in the right or left ſide of the jaw: But when a tooth is to be extracted from the under jaw, if it is on the right ſide, the operator ſhould be placed ſomewhat to the left; and, vice verſâ, when the tooth is on the left ſide, the ſurgeon ſhould place himſelf ſomewhat to the oppoſite ſide. That the inſtrument may be applied with as much freedom as poſſible, as well as to prevent the gums from being lacerated, all the ſoft parts adhering to the teeth ſhould be ſeparated, by inſinuating between them the point of the ſcarificator, fig. 1. Plate XXXVII.; and this being done, the operator muſt proceed to the application and uſe of the key.

The patient having cleared his mouth of blood produced by ſeparating the gums from the tooth, the point of the claw, Plate XLVI. fig. 1. muſt be preſſed as far down

down between the gum and root of the tooth as possible; and in this situation it must be firmly fixed and retained with the fore-finger of the left-hand, while the fulcrum C, being placed as far down as it will go upon the gums on the opposite side of the tooth, the operator must now with his right-hand apply such force as may be sufficient to move it; and by turning the handle firmly round, almost any tooth may be taken out at one pull without raising the instrument: But whenever a tooth proves to be firmly fixed, and especially if it is one of the large molares whose roots diverge considerably, it is better, after it is freely loosened, to remove the instrument; and having turned the claw to the opposite side, to apply it so as to turn the tooth to the other side of the jaw, by which it will be made so completely loose as to be easily taken out with common teeth forceps, Plate XLVIII. fig. 3.

In using the key, when the tooth to be taken out is firmly fixed, especially when there

there is no vacant ſpace between it and the contiguous teeth, ſome care is neceſſary to prevent theſe laſt from being looſened. When it cannot be done in any other manner, the edges of the tooth to be removed, ſhould be filed down with a thin file, and it may be done without hurting the neighbouring teeth, by uſing a file that is ſmooth or poliſhed on one ſide.

This I believe to be the beſt method hitherto known of extracting firm teeth from the back part of either of the jaws; and the inciſores and canine teeth may likewiſe be pulled in the ſame manner: But theſe, namely, all the fore-teeth, as well as looſe teeth in every part of the jaw, may be pulled in a different manner, which I ſhall afterwards deſcribe.

Although there is ſome difference of ſtrength, as I have already obſerved, between the outer and inner plates of the alveoli of the teeth, the difference is ſo trifling, that in pulling a tooth it merits little conſideration. Neither does the direction of the roots of teeth deſerve attention in this operation: For although it is alleged

alleged by ſome, that they may be turned with moſt eaſe towards the inſide of the mouth, from their roots being ſuppoſed to ſpread towards the outſide of the jaw; yet this is by no means the caſe. For the moſt part, the roots of the large molares diverge equally towards both ſides of the jaw; ſo that in this reſpect they may be pulled with the ſame propriety to the one ſide as to the other. But the two laſt molares of the lower jaw afford an exception to this; for they are ſo ſituated, that in every inſtance where the common key is employed, they ſhould be turned inwards. The baſis or origin of the coronoid proceſs forms a ſtrong ſharp ridge on the outſide of the jaw, exactly oppoſite to the roots of theſe teeth; ſo that, when turned outwards, as the heel of the inſtrument muſt reſt upon this ridge, the gums which cover it are neceſſarily much bruiſed. When a tooth is much ſpoiled on one ſide, it is almoſt the univerſal practice in pulling it, to fix the point of the claw on the ſound ſide; and this being conſidered as neceſſary,

necessary, may be given as a reason for our being obliged in some instances to turn even one of these teeth towards the outside of the jaw. This, however, is not on experience found to be the case; for, in general, it is supposed to answer best to fix the claw of the instrument on the soundest side of a tooth, and to turn it to the opposite side; yet with due pains and attention, we might perhaps in every instance follow the very reverse of this with equal success: For with a proper application of the scarificator, we may almost always separate the gums, so as to be able to press the point of the claw far enough down upon the root, and in this manner to turn it with ease to the opposite side.

The key-instrument, however, may be made so as to turn even the two farthest molares outward, without doing any injury to the gums lying above the process that I have mentioned. A form of it for this purpose is delineated in Plate XLVI. fig. 3. which I proposed several years ago, and which I have often used. By the

heel of the inſtrument reſting upon the gums beneath the firſt great molares, while the claw is bent in ſuch a manner as to apply to either of the two poſterior teeth, they may in this manner be turned out with ſafety. The heel ſhould be made long, ſo as to paſs far down upon the gum; otherwiſe, for this particular purpoſe, it will not anſwer ſo well. Indeed the heel of the key-inſtrument ſhould be always longer than it is uſually made; for when ſhort, it acts with much leſs power, and is more apt to break the tooth, than when made of a greater length. The contrary of this I know has been much inculcated; but after giving a fair trial to both methods, I am now convinced that the key with a long heel is much preferable to the other. The chief objection to the uſe of a long heel is, that it muſt bruiſe the gum more than a ſhort one. This, however, is not the caſe, as will be readily allowed by all who attentively think of it; for even the ſhorteſt heel muſt preſs upon ſome part of the gum; otherwiſe, if applied upon the

tooth

tooth itself directly opposite to the point of the claw, as some have advised, it will act in nearly the same manner, and with no farther power than common forceps: While, again, a long heel, does not, as is commonly imagined, injure the gums in proportion to its length; for although the flat side of it is applied to the gums at first, as soon as it begins to act, the farthest point of it only will be found to touch them; and accordingly this part of the heel, as well as all the rest of it, should be made as smooth as possible; so that in turning upon the gum, it will do less harm than when of a rough surface according to the usual form.

I have already observed, that in pulling teeth, the side to which they are turned need not be much regarded, from any difference of strength between the outer and inner plates of the alveoli or sockets; for in this respect they are nearly similar. But even although the difference was more than it really is, it would not merit attention; for, in pulling teeth in the manner

ner I have defcribed, namely in an oblique or lateral direction, it is evident that the fockets muft be broken on both fides; at leaft this muft be always the cafe where the roots of a tooth are of the ufual length, and not fhortened, as they fometimes are by difeafe; for while the corona of a tooth is forced down upon one fide of the focket, the point of the root muft neceffarily be turned in nearly the fame proportion upon the other. The fofter parts will not indeed fuffer fo much, as they will not be bruifed by the heel of the inftrument; but the focket muft obvioufly be much hurt by it; fo that, in every point of view, little or no confideration is due in this operation to any fuppofed difference between the ftrength of the two plates of which the fockets of the teeth are formed.

But as it is of much importance to fave both fides of the alveoli as far as poffible, nothing fhould be omitted that can with propriety be done for their protection. For this purpofe, a form of the key-inftrument has

has been proposed, for supporting the gums and alveoli, while the tooth is raised and separated from them by turning the instrument in the usual manner. But if the socket is supported, and not allowed to yield on the tooth being pressed towards it, there is much reason to fear that the tooth itself would break; and if the instrument be not applied in such a manner as to have this effect, it will answer no other purpose than the key in common use; while, being more complex, it is managed with more difficulty. The proposal, however, is ingenious, and may lead to improvement in the operation of tooth-drawing *.

In pulling a tooth with the key-instrument, it is the common practice to force it out at once. But although this may sometimes succeed, it ought not to be tried; for when the roots of teeth diverge much, or when any portion of the fang is enlarged,

* This instrument is the invention of Dr John Aitken. For a more particular account of it, see Essays on several important subjects in Surgery.

enlarged, as is ſometimes the caſe, we run much riſk, by this method, of breaking them, at the ſame time that the ſocket muſt be much more injured than when the tooth is looſened in the manner I have adviſed, by turning it firſt to one ſide and then to the other with the key-inſtrument, ſo as to be able afterwards to take it out with common forceps. And if this is done ſlowly, with a gradual equal preſſure, and if the heel of the key has been properly covered with ſeveral plies of ſoft linen, ſcarcely any harm can be done by it: But inſtead of this, when the inſtrument is applied directly to the gum, without the intervention of any ſoft ſubſtance, and the tooth turned out, as is frequently done, by a ſudden jerk, the gums are not only greatly bruiſed and lacerated, but the ſocket is more ſeverely injured, at the ſame time that the tooth itſelf is under a greater riſk of being broken than when pulled in a more gradual manner. It is natural for patients, ignorant of the riſk attending it, to wiſh for the operation to be quickly done;

done; but it is unpardonable in practitioners to indulge them in this, when a moment's reflection must convince them, that a tooth cannot be quickly pulled but with much risk, either of the jaw or it being broken.

Even when the operation is done in the most cautious manner, troublesome accidents sometimes ensue from it: And these particularly are, contusions of the gums; splinters of bone being separated from the jaw; and alarming hemorrhagies.

Laceration and contusion of the gum being a very painful part of the operation, we ought, as far as possible, to guard against it; not merely by covering the heel of the instrument in the manner I have advised, but by declining to use it while the gums are much inflamed; for while much inflammation continues, the operation necessarily gives much more pain than it otherwise would do. For obviating the effects of laceration, when any portion of gum is much separated from the rest, it should be cut off with

 scissars;

ſciſſars; the mouth ſhould be fomented from time to time with warm milk, or any emollient decoction; and when there is cauſe to imagine that ſuppuration will take place, it ſhould be encouraged by the application of roaſted figs or onions, by way of cataplaſm. In this manner, if an abſceſs occurs, it will be ſoon brought to maturation; when, if it does not burſt quickly, it ought to be opened: And again, in ſlighter contuſions, nothing alleviates the pain induced by them ſo effectually as the applications I have mentioned.

When the ſocket only has ſuffered, little or no harm enſues from it; ſo that it is ſeldom neceſſary to mention it even to the patient. But when the ſplinter extends to the more ſolid part of the jaw, which in children eſpecially is apt to happen if the operation is not done with the utmoſt attention, as the ſore that enſues proves commonly tedious, and does not readily heal as long as any looſe pieces of bone remain in it, any of theſe

that

that are perfectly detached ſhould immediately be taken away; but as they are ſeldom ſo completely ſeparated as to come eaſily away at firſt, no force ſhould be uſed in it, as they afterwards either fall out of themſelves, or may be eaſily taken away on a free formation of matter taking place. After this, if the matter is prevented from lodging, and if the conſtitution is in other reſpects ſound, the ſore uſually heals with eaſe.

Hemorrhagies of importance are not frequently produced by tooth-drawing; for the bloodveſſels of the teeth being ſmall, it is ſcarcely poſſible that they can diſcharge much blood. But when the roots of teeth are deeply fixed in the jaw, and when much force has been uſed in the operation, we can eaſily ſuppoſe that in this manner ſome of the larger arteries of the contiguous parts may be divided; and it is thus I imagine that any troubleſome hemorrhagy is ever produced by this operation. At firſt we adviſe the patient to take frequent mouthfuls of cold water,

water, red wine, brandy, vinegar, or even alcohol; and for the most part one or other of these prove successful; but when they happen to fail, other means must be employed, and the most powerful of these is compression. A dossil of soft lint, fitted to the opening, must be pushed into it; and the patient being desired to compress it, by keeping his mouth shut, if this is properly done, it does not commonly fail. I have met with instances, however, even of this proving unsuccessful, and of fainting and other distressful symptoms being produced by the hemorrhagy. In this situation the actual cautery is alone to be trusted; and it must be applied with freedom, otherwise no advantage ensues from it. A small bit of lunar caustic inserted into the opening might answer; but it does not act with such certainty as the other, while there is more risk of its doing harm, from its being apt to spread so as to injure the contiguous parts.

The key-instrument is perhaps the best hitherto invented for the pulling of teeth

in an oblique or lateral direction; but we have several others that act nearly on the same principles: These, however, being less perfect, I shall not delineate them all here; but with a view to convey some idea of them to such as may not have other opportunities of seeing them, I have given a representation of two of them in Plate XLVII. figs. 2. and 3. But even these, although the best with which I have met, are far inferior to the key: For they act with much less power; and they have this material defect, that they can never be employed for pulling teeth towards the inside of the mouth.

I have thus described the method of extracting firm teeth from the back part of the mouth. Any of the fore-teeth may likewise be pulled, as I have already observed, with the same instruments; for they may be turned either inwards or outwards, by a proper application of the key: But they may also be pulled in a different method; and as this may be done with instruments that do not bruise the gums, they

they ſhould perhaps in every inſtance be pulled in this manner.

The inciſores and canine teeth, and even the two ſmall molares have only one root; ſo that they are never ſo firmly fixed in the jaw as the large grinders; and they may be extracted with more eaſe. For the moſt part this may be done with the common teeth-forceps repreſented in Plate XLVIII. figs. 1. 3. or 4. In uſing this inſtrument, it ſhould be preſſed as far down upon the tooth as poſſible, otherwiſe it is apt to break off the corona or upper part of it, and to leave the root; and the tooth ſhould not be pulled directly upwards, but twiſted alternately from one ſide to the other till it becomes looſe, when it may be taken out without further trouble.

In ſome caſes, however, even the fore-teeth are too firmly fixed to admit of being pulled with this inſtrument: I have therefore given a repreſentation of forceps that act with more power; a very ingenious invention firſt made public in the

British

British Magazine in the year 1762. It is delineated in Plate XLIX. figs. 1. and 2. Fig. 1. represents a common strong forceps with moveable claws. The axis of the claws is shown at *A*. Fig. 2. is a fulcrum. *B*, *C*, is the handle going off obliquely from *B*, by which it is more easily applied. *B*, *F*, *D*, is a plate of iron covered underneath with a piece of soft buff; and *E* is the other side of the same plate made round, smooth, and uncovered. The tooth intended to be pulled is laid fast hold of with the forceps, fig. 1.; then the fulcrum *B*, *F*, *D*, is placed upon the neighbouring teeth, when the forceps being placed upon the round part of the plate *E*, by a proper motion of the lever *G*, *H*, *I*, *K*, the tooth is in this manner extracted. In the pulling of loose teeth, this instrument may be used so as to draw them nearly straight up; and this we are told may even be done where the teeth are firm, provided their roots do not diverge much, and that there are no osseous adhesions between them and the sockets: But with a view to pre-

vent

vent any bad consequences that might ensue from the application of much force, we are desired by the anonymous author of the instrument, instead of attempting to pull firm teeth directly upwards, to twist them outwards, which loosens them so much, that they may then be pulled in a perpendicular direction with much ease.

The advantage supposed to be derived from forceps with moveable claws is this: When common forceps is used with immoveable claws, if the tooth is firm, it must either be forced out obliquely, or the first hold must be lost, and the instrument fixed again: But when the claws are moveable, the instrument retains its hold, so that the tooth may be pulled nearly in a perpendicular direction; for the claws, by turning upon centres, will always fall into the way of the tooth; and will therefore raise it nearly in a straight line.

I have taken different opportunities of observing, that the most painful part of tooth-drawing arises from the bruising and

and laceration of the gums and ſockets; a circumſtance that cannot be altogether avoided when the key-inſtrument is employed. The great object of the forceps that I have juſt deſcribed being to pull in a ſtraight direction, by which the gums and ſockets are almoſt entirely ſaved, would render it the moſt complete inſtrument that hitherto has appeared, were it not liable to ſome very important objections. The ingenious author of this forceps thinks it may be employed for the extraction of any teeth; even of the large molares; but as the mouth cannot be ſo widely opened as to admit of our applying it properly, this attempt ſhould not be made with it: It muſt therefore be confined, as I have obſerved already, to the pulling of teeth in the fore part of the mouth. But beſides this, as the fulcrum is placed upon the contiguous teeth, when the tooth to be pulled is firmly fixed, it is ſcarcely poſſible to prevent theſe from being hurt: For they will be very apt to ſuffer even when the preſſure is made as nearly

nearly as possible in the direction of their roots; and when this is not done with accuracy, they are apt to be broken, or even forced entirely from their sockets. In the pulling of loose teeth, however, and whenever the fore-teeth are not so firmly fixed as to require much force to move them, this instrument may be employed with advantage. When, again, it is discovered upon trial, that an unusual degree of force is necessary, a prudent practitioner will rather lay the forceps aside, and finish the operation with some other instrument. The common key, as I have already observed, may be used; or either of the instruments, fig. 1. and 2. Plate XLVII. may be employed for loosening the tooth; after which it may be taken out either with these or with common forceps.

I have hitherto been supposing that the tooth to be pulled is only carious in a particular part, and that a considerable part of the corona is still remaining. When a tooth becomes so much diseased that

that the upper part of it falls entirely off, so as to leave little or nothing above the gums, the remaining part of it is thus reduced to what is commonly termed a Stump.

In this stage of the disease, the connection between the roots that remain and the sockets, undergoes a very important change. By the corona being removed, the roots, whatever number there may be, are all separated from each other; for being united solely through the intervention of the corona, their connection must evidently be destroyed on this being taken away. In this manner their connection with the sockets becomes less firm, than when diverging roots, tied together above, tend all to support each other; but they become still more loose by a dissolving or wasting process, to which teeth in this situation are always liable. A considerable part of the corona of a tooth may become carious, and fall away, without the roots being affected; but I have scarcely known an instance of the corona

being completely removed for any length of time, where the roots did not suffer a remarkable diminution. Nay, in some cases, the roots, even of the largest molares, have been almost completely annihilated; and instead of the long fangs with which these teeth in a state of health are furnished, only a small point or two of spoiled bone has been met with. In consequence of this they become loose; and their connection with the jaw being now very superficial, they may be forced out much more easily than a large tooth. I know that practitioners in general are not of this opinion, the pulling of a stump being for the most part considered as more difficult, as well as a more painful operation, than the extraction of a large tooth. This, however, can proceed only from want of experience in this branch of practice; for those who are more versant in it know, that there is much more pain, hazard, and difficulty, in the pulling of a complete tooth when firmly fixed, than in the taking out of several stumps.

When

When the point of the claw can be forced so far down upon a stump as to get a firm hold, it may be pulled with the key-instrument in the manner I have advised for the extraction of large teeth; but this should not in general be done, as we may commonly employ a sufficient force with instruments that do not injure the gums, and by which a very painful part of the operation may be avoided. When the stump can be laid hold of, either with common forceps, or with those with moveable points, this, as the easiest method, should be preferred: But when so much spoiled, as to be nearly, or perhaps entirely, covered with the gums, the points of forceps cannot be pressed sufficiently down upon it; in which case, we are under the necessity of forcing it out with a simple lever. This instrument is commonly termed a Punch; of which different forms are represented in Plate L. figs. 1. 2. and 3. In using it, the gums must be freely separated from the stump with a scarificator; and the point of it being

preſſed down upon the root, a degree of force muſt be applied with it, ſufficient for raiſing the root from the ſocket; and this being done with one of the fangs, the inſtrument muſt, in a ſimilar manner, be applied to the others.

With thoſe accuſtomed to the uſe of the punch, this operation is ſimple and eaſy, while with others it proves both tedious and difficult. With a view to apply as much force as poſſible, the point of the inſtrument is commonly puſhed as far as it will go towards the root of the fang: But by this means much of the force is loſt againſt the alveoli of the oppoſite ſide; which being firmer and ſtronger towards the baſe of the jaw, do not ſo readily yield at this part as where they are thinner and not ſo firmly ſupported. It anſwers better to puſh the inſtrument no farther down upon the fang than is merely neceſſary for procuring a ſufficient reſt for the point of it; for I know from experience, that a ſtump may be forced out in this way with more eaſe than

than in any other manner. When the punch does not force it out entirely, but serves merely to loosen it, it may in this state be laid hold of with the forceps, and removed in the manner I have pointed out.

For the most part, a punch of the form represented in Plate L. fig. 1. answers best. With this the force is applied so as to push the fang towards the opposite side of the jaw; but it sometimes happens, that the upper point of the root is of such a form as does not readily admit of force being applied to it in this direction; in this case we employ a kind of hook or crooked lever, such as is represented in fig. 3. by which the stump is drawn or raised in a contrary direction.

I have thus described what, by experience, I have found to be the surest and easiest method of extracting teeth. A variety of instruments may indeed be met with in other authors, which I have not mentioned, and by which, it is said, by their inventors, that the operation may

be done with more eaſe. But this not being ſupported by the reſult of practice and obſervation, it will not be expected that I ſhould give any account of them.

§ 2. *Of Toothach from Inflammation.*

THE ordinary ſymptoms of toothach ariſe, for the moſt part, as I have already remarked, from the nerve being laid bare, either from a tooth becoming carious, or from the enamel being broken by external violence. It ſometimes happens, however, in a very violent manner, merely from an inflamed ſtate of the membrane ſurrounding the root of a tooth, or from the parts within the body of the tooth becoming inflamed. We judge of this being the cauſe of toothach, when a ſevere permanent pain attacks a tooth that outwardly appears to be ſound: And this eſpecially when it has been evidently induced

ced by much exposure to cold, or when it is connected with other symptoms of inflammation, such as an inflamed state of the contiguous cheek, or swelling and suppuration in the adjoining gums.

In most instances, we may be able to trace this variety of toothach to this cause, namely, exposure to cold; in some cases, however, it proceeds from causes of a different nature. Whatever excites inflammation in other parts of the body, will produce the same effect when applied to the membrane that surrounds the root of a tooth: And we know from experience, that inflammation of this membrane is sometimes induced by a disease to which the roots of the teeth are liable; what is termed the Swelling of the Fang, a hard knot or exostosis that sometimes forms at the point of the root. At first, the pain induced by this may be supposed to originate altogether from distention; but ultimately it commonly terminates in a very severe degree of inflammation. And inflammation of these parts, by whatever

 cause

cause it may be induced, is always attended with more violent pain than what commonly takes place from similar affections in other parts, owing to their being here surrounded with bone, which prevents them from yielding so readily to that distention of the vessels that always occurs in inflammation.

In the treatment of this variety of toothach, we find, in general that those remedies prove most useful which answer best in inflammatory diseases of other parts. Local blood-letting, either by scarifying the gums with a lancet, or by the application of leeches, often gives relief. I have known the pain removed by the application of a blister to the contiguous part of the cheek; and much advantage is often derived from a large dose of laudanum: by procuring a temporary diminution of pain, it thus lessens irritation, and hence an abatement of the inflammation itself. The head should be kept warm with coverings of flannel; a practice that should be inculcated with all

who

who are liable to toothach, from whatever cause it may proceed, but particularly when it originates from inflammation; and in this case, fomenting the head with the steams of emollient herbs, or even of warm water alone, will often procure relief when every other remedy has failed. In some cases, indeed, cold water, vinegar, or ardent spirits taken into the mouth, prove serviceable; but for the most part, warm applications prove more useful in this variety of toothach.

By duly persevering in the use of one or other of these remedies, the pain will commonly be at last removed; and in toothach arising from inflammation, we are particularly induced to give them a full trial, from our knowing that the disease is not apt to return, after being once removed. But, when other means do not succeed, we are under the necessity of advising the tooth to be extracted, the only remedy in such circumstances, on which we can depend. In extracting a firm tooth, I have already advised it to be done in a

slow

ſlow gradual manner, with a view to prevent it from breaking, and the jaw from ſuffering ſo much as it is apt to do when a tooth is forced quickly out. This caution, however, is more eſpecially neceſſary in the extraction of teeth under the circumſtances we are now conſidering; for, when the pain originates from inflammation alone, without any part of the tooth being ſpoiled, the roots are always entire, and more firmly fixed than when the corona of a tooth is moſtly conſumed, and when the roots, therefore, are commonly in ſome degree decayed. And beſides, when pain and inflammation are induced, as I have already remarked, by ſwelling or enlargement of the fang, and which can never be previouſly diſcovered, if the tooth be turned quickly round it will for certain break; and the ſwelled part of it being left behind, ſcarcely any advantage will be derived from the operation, while all the pain and diſtreſs which it uſually excites will be ſeverely felt by the patient.

On pulling a tooth that is not in any part carious, we are advised by some practitioners to replace it, and to tie it to the contiguous teeth, till it becomes firm. This I have done in different instances; but I think it right to observe, that it often fails, owing, I presume, to the experiment being most frequently tried with teeth in a state of inflammation. I know that it often answers where no symptoms of inflammation have taken place; but whenever the membrane surrounding the roots of teeth, or even when the contiguous parts only are much inflamed, it will seldom or never succeed, while, at the same time, the trial will always excite much pain and distress. It ought not, therefore, to be advised indiscriminately in every case, as has frequently been done.

§ 3.

§ 3. *Of Toothach arising from Affections of distant Parts.*

All the symptoms of toothach sometimes take place in one, two, or more teeth, where even with the most accurate examination we cannot discover the least appearance of disease; where we are therefore certain that no part of them is carious, and even where it is obvious, that the disease does not originate from inflammation.

In such circumstances, as the patient is at first always unwilling to part with a tooth that appears to be sound, all the remedies usually employed in toothach are made use of; such as blisters,—blood-letting with leeches,—the application of ardent spirits and strong essential oils to the pained part; and after being for some days tormented with these, with little or no advantage, the pulling of the tooth is recommended as a remedy that does not fail.

fail. Even this severe alternative is at last agreed to; but unfortunately with no benefit. The tooth in which the pain seems to be most severe is first taken out; but the contiguous teeth becoming soon pained in an equal degree, they are from time to time taken out, till at last I have known all the teeth of one side of a jaw extracted, and still the pain continue equally severe in the gums as at first.

In such circumstances, we often find, that the pain in the tooth is induced by an affection of some other part, and that no remedy will answer that is not directed to the original disease. It originates in some instances from rheumatism;—it has been known to proceed from an arthritic diathesis;—it occurs as a frequent symptom in hysterical affections;—pregnant women are frequently distressed with it;—and in some cases it obviously proceeds from a foul state of the stomach.

When the pain originates from a foul stomach, which may be often known by the state of the tongue, as well as other circumstances,

circumſtances, no remedy proves ſo uſeful as an emetic. I have known the moſt violent toothach, which for many weeks had reſiſted the effects of every other remedy, almoſt inſtantaneouſly removed by an emetic; and when the ſtomach is ſufficiently cleared, a plentiful exhibition of Peruvian bark will often prevent a return of it; particularly where the fits of toothach have returned periodically, as they ſometimes do ſo regularly as to give cauſe to imagine that they depend on a tendency to ague.

In this variety of toothach, ariſing from an affection of the ſtomach, no benefit is derived from laudanum. Inſtead of procuring eaſe, it ſeems rather to increaſe the pain, and, by inducing ſickneſs, to render the patient in every reſpect worſe. But in thoſe varieties of the diſeaſe, which originate from rheumatiſm, gout, or hyſterical affections, opiates will for the moſt part remove the pain entirely: And a return of it may be frequently prevented merely by keeping the parts ſufficiently

sufficiently warm. In hysterical patients, a combination of laudanum with ether has sometimes proved useful, when opiates in every other form have failed.

Opiates are often used in toothach induced by pregnancy; but seldom with advantage. In large doses indeed they sometimes procure a short relief from pain; but nothing I have tried answers with such certainty as blood-letting. A plentiful discharge of blood, by the application of leeches to the neighbouring gums, will sometimes answer the purpose; but as the pain seems here to originate from a general plethoric state of the system, it commonly proves more effectual to empty the vessels by taking away ten or twelve ounces of blood from the arm. I have known women immediately relieved by blood-letting, who for several weeks had been liable to very violent degrees of toothach, and in whom neither tooth-drawing, opiates, blisters, nor any other remedy, were productive of any advantage.

When

When a practitioner finds that he has pulled a tooth in the circumstances we are now describing, where there is neither inflammation nor much caries, he may with much propriety replace it. After clearing the tooth and socket entirely of blood, it should be put as nearly as possible into its natural situation; where it should be tied to the two contiguous teeth till it becomes firm.

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SECTION X.

Of Transplanting Teeth.

THE advantages of a ſound ſet of teeth, both with reſpect to beauty and utility, are evidently great: We are not therefore ſurpriſed at finding the fertile genius of modern artiſts employed in endeavouring to ſupply the loſs of thoſe teeth which accident or diſeaſe may have occaſioned. The method of ſupplying theſe deficiencies, and even of making complete ſets of teeth, has been long known, and the art has long been carried to great perfection; but the tranſplanting of human teeth from one living body to another is the invention of modern artiſts. The mere propoſal of ſuch a nice operation was entitled to much credit; and in no inſtance does the art of ſurgery appear to more advantage than in render-

ing the practice of it perfect. It will readily be conceived, however, that it is not admissible in every case. Various circumstances must concur to render it practicable; but it may commonly be done wherever it is necessary.

1. As it is in general more with a view to obviate deformity, than to be productive of any real advantage, that the transplanting of teeth is practised, it is seldom considered as necessary with any of the large molares. Indeed with these it could not often take place; for as the roots of them often diverge in a very uncertain manner, and as the number and length of the roots can never be previously determined, it would for the most part be impossible to procure teeth exactly fitted to the vacancies intended to be filled up. The practice is therefore confined almost entirely to the incisores and canine teeth, although it may be done with nearly an equal certainty in the small molares; for in them the roots are either single, or if

there.

there are two fangs they are almoſt always united.

2. In order to enſure ſucceſs, the alveoli and gums muſt be perfectly ſound. They muſt be free from ſcurvy and the lues venerea; nor muſt the patient undergo this operation for a conſiderable time after a ſalivation. The uſe even of a ſmall quantity of mercury frequently leaves ſuch a ſoft ſpongy ſtate of the gums, as renders it improper while it continues to attempt any operation upon them. Hence thoſe who are to have teeth tranſplanted, ſhould carefully avoid even the riſk of contracting any complaint for the cure of which mercury may be neceſſary *. A patient being liable to gum boils has been conſidered as an objection to this operation; but where every other circumſtance concurs to render it proper, it ſhould not be forbid by this: For although it would not probably ſucceed where the

* This caution is particularly inculcated by the late very ingenious Mr John Hunter, in his Treatiſe on the Diſeaſes of the Teeth, page 98.

ſurrounding ſocket is carious; yet we know that gum boils often occur where the ſocket is not in any reſpect diſeaſed.

3. As the ſucceſs of the operation will depend in a great meaſure not only on a ſound ſtate of the alveoli, but on the ſockets being full and complete, it will ſeldom anſwer where teeth have remained long in the ſtate of ſtumps: For in this ſtate the roots commonly waſte away ſo as to loſe much both of their length and thickneſs; and the alveoli diminiſhing in nearly the ſame proportion, ſufficient ſpace would not be left for fixing the roots of a ſound tooth. The attempt, however, may be always made, where any conſiderable part of the corona of a tooth is left; for in this caſe the roots, as I have formerly remarked, are uſually complete, however much the caries may in other reſpects have ſpread.

4. It is in youth and middle age only that this operation is admiſſible. In childhood and old age it ſhould not be attempted. In childhood, a tooth put in, in

in this manner, would never become firm, as the approaching tooth of the second set would always be acting against it; and besides, as any vacancy produced at this period will be filled up when the second set comes forward, it can never be requisite. In old age again, two strong objections occur to it. At this period the sockets of the teeth are commonly much diminished, particularly in depth; and many of the smaller bloodvessels being now obliterated, it is not probable that any transplanted tooth would ever become firm: For, when the operation succeeds, as a firm union always takes place between the tooth and contiguous parts by means of bloodvessels passing from one to the other, we are led to imagine that it would not otherwise answer. Now this, for the reason that I have mentioned, can never happen in advanced periods of life.

5. The transplanted tooth ought to fit the socket as exactly as possible: But it should not require much force to insert

it; for if in any degree too large, either in length or thickneſs, it will create much unneceſſary pain; the irritation produced by it will probably terminate in ſuppuration; and in this manner the operation will be rendered abortive. Several people therefore ſhould be provided for the purpoſe of furniſhing teeth; ſo that the operator may have no difficulty in finding one of a proper ſize: It will frequently happen, that a tooth of the ſame ſize taken from one perſon, will fit the ſocket of the ſame tooth in another perſon very exactly; but when it is found, that the roots of the tooth newly pulled are either too long or too thick for the ſocket in which they are to be placed, they ſhould be filed down till they go eaſily in; for it is not found that the removal of a ſmall part of the root prevents the ſucceſs of the operation; and care ſhould be taken to make the ſurface of the tranſplanted tooth ſomewhat lower than the level of the contiguous teeth, ſo that no inconvenience may enſue from the tooth in

in the opposite jaw being pressed against it. This difference in length, however, need not be so considerable as to be very perceptible; for the smallest difference will answer the purpose, and a greater degree of it would produce deformity.

But although the roots of teeth to be transplanted may be lessened with a file, no part of the corona should be touched or injured. It is sometimes indeed done by dentists, and it may in some instances succeed; but as it must always be attended with some risk of the tooth becoming carious, it should never be advised; especially as, with due attention, it can never be necessary; for although we may be mistaken with respect to the size of the roots of a tooth, we have it always in our power to determine with accuracy, whether the upper part of the tooth to be pulled will fit the vacancy or not.

6. In taking out the new tooth and removing the old one, much care and attention is necessary; for if the new tooth is much broken, or if the socket in which

it is to be placed is much injured, the operation will not ſucceed. When it is poſſible therefore to take out the old tooth with the forceps, it is better to do it in this manner than with the key-inſtrument, which can ſcarcely be uſed without injuring the parts too much.

7. When the tooth is removed, the ſocket cleared of blood, and the new tooth inſerted under the reſtrictions I have mentioned, we are next to endeavour to keep it firmly fixed till an adheſion ſufficient for retaining it takes place between it and the neighbouring parts. This muſt be done by tying it to the two contiguous teeth, and by much attention on the part of the patient to do nothing to looſen it. In tranſplanting a canine tooth, the ligature, which ſhould be made of ſeveral plies of fine ſilk properly waxed, ſhould be firſt tied round the upper part of the new tooth, immediately above where it begins to ſwell; and on the tooth being properly placed, it ſhould be tied to the two contiguous teeth, taking care to paſs the ligature

gature as near as possible to the gums. But when an incisor or small molaris is transplanted, it answers better to fix the ligature first to the contiguous tooth near to the junction of the gums, and then to pass it over the surface of the new tooth, and bringing it again back, to fix it where it commenced, round the necks of the other teeth. In this manner the transplanted tooth is pulled down by the ligature into the socket; but much care is necessary to prevent it from being drawn too much either to one side or another; for nothing more certainly prevents our success than the new tooth being made to press upon either of the contiguous teeth. This, however, will never happen in the hands of an expert artist, who has been sufficiently accustomed to this branch of practice; nor can it happen with any who is duly warned of the consequences that may ensue from it.

When the ligatures are properly fixed, they may not perhaps need to be renewed; but when they either slip off accidentally,

dentally, or become loose, they should immediately be renewed; and the patient should be constantly on his guard to avoid whatever might in any degree loosen or shake the tooth. Nor is it sufficient to attend to this for a few days only: The same kind of caution must be continued till the tooth becomes firm; and the length of time necessary for this will depend on the circumstances of every case; on the particular state of the alveoli; on the age and habit of body of the patient; and on the operation being done with more or less accuracy: In some cases a tooth will become perfectly firm in the space of eight or ten days; while in others it will remain somewhat loose for two or three months. During all this period the patient should live as much as possible on spoon-meat, and should guard particularly against cold; for nothing renders the success of the operation more uncertain than exposure to cold or dampness.

The most important objection that has been started to the transplanting of teeth,

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is the risk with which it is attended of communicating diseases; and I must own that *à priori* it appears to be a very material one. It has not however been found on experience to be sufficient to counterbalance the advantages that individuals suppose they derive from it; for the operation is daily practised; and we seldom hear even of any suspicion of its having carried infection into the system. I am not, however, of opinion with those who think that diseases cannot be communicated in this manner. On the contrary, I think those practitioners do not deserve to be employed, who treat a matter of such importance to their patients with indifference. Teeth for the purpose of transplanting should never be taken from people with any appearance of disease. Those only should be used that are procured from constitutions in which there is every possible evidence of health; and with a view to prevent as much as it can be done, every risk of infection being conveyed, the tooth to be transplanted should

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be immersed for a few seconds in luke-warm water, and should afterwards be entirely cleared of any blood or matter that may adhere to it, by rubbing it between the plies of a piece of soft old linen.

There is reason indeed to imagine, from the result of some experiments made with a view to inoculate the measles, as well as some other diseases, with the blood of those infected with the disease, that infection cannot be communicated in this manner. But the point is by no means so certain as to warrant our placing much dependence upon it.

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SECTION XI.

Of the RANULA.

TUMORS of different degrees of consistence frequently form beneath the tongue, sometimes on one side, and at others on both sides, of the frenum; and in general they are distinguished by the term Ranula. They seldom give much pain; but in some instances they become large, so as even to impede the sucking of infants, and the mastication, and speech of adults. In such circumstances, the assistance of surgery becomes necessary.

In some cases, these tumors contain a fatty kind of matter: This, however, is rare; and for the most part, perhaps in nineteen cases of twenty, they are filled almost entirely with a thin limpid liquor, very much resembling saliva; and we find, on cutting into them, that they are often produced by a stoppage of the salivary ducts,

ducts, the effect of calculous concretions. They sometimes arrive at a large size; but in general the tumor bursts when of the size of a large nut, leaving an ulcer that proves difficult to heal, if the real cause of it is not discovered and removed. I have known this kind of ulcer treated with much attention for the space of several months,—various detergent and even corrosive applications employed for it,—nay, in one instance a long mercurial course was administered, but with no advantage whatever; and, at last, on the true origin of the disease being discovered, it was cured in the space of a few days, merely by removing a portion of hard calcareous matter, which, by stopping the natural passage of the saliva, first produced the tumor, and afterwards prevented the ulcer, in which it terminated, from healing. In some instances these concretions are small, not larger perhaps than the head of a middle sized pin; whilst in others they are large. I have in different instances found them of the size of a kidney-bean.

In all cases where the tumor is soft, our best practice is to lay it open with a scalpel from one end to the other; by which any calcareous particles contained in it are easily discovered; and these being removed, the remaining sore commonly heals easily. There is no necessity, however, for washing the sore, as we are generally advised to do, with tincture of bark and other astringents: On the contrary, warm water and other emollients answer better, by washing out more effectually any particles of stone that may not have been previously discovered. When indeed the sore proves afterwards difficult to heal, the others may sometimes be employed with advantage.

The same kind of treatment should be pursued in the treatment of old fistulous sores of these parts. In almost every case where the disease is seated in any of the salivary glands or ducts, it will appear to be kept up by the cause I have mentioned, namely, a stoppage of the duct by a particle of stone; and the removal of this, by

an incision, and turning it out with a probe or a scoop, will very commonly answer.

When, again, tumors in this situation are of a fatty or even of a firmer consistence, instead of cutting into them, they should be extirpated entirely; and unless they lie deep, and are of a large size, it may always be done with safety.

Practitioners are very properly indeed afraid of hemorrhagies in this situation; for as the arteries lie deep, it is always difficult, and most frequently impossible, to secure such of them with ligatures as happen to be cut. But wherever the tumor is loose, and not deeply attached to the contiguous parts, it may be taken out without any risk of hemorrhagies; for the superficial arteries being small, any discharge which they produce, in general, stops, by the application of oil of vitriol, duly diluted, — alcohol, — or tincture of myrrh. In more violent hemorrhagies, the potential or even actual cautery should be employed; but means of this kind are seldom necessary.

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In the removal of these tumors, where they lie so deep that they cannot be easily laid hold of with the fingers, small forceps are usually employed; but a small hook with two fangs, such as is represented in Plate XXXVII. fig. 3. answers better.

SECTION XII.

Of ULCERS *of the* MOUTH *and* TONGUE, *and* EXTIRPATION, *of the* TONGUE.

THE tongue and other parts within the mouth are liable to all the variety of ulcers incident to other parts of the body; and the means of cure that are employed for them should be nearly similar. When they seem to proceed from lues venerea, scrofula, or scurvy, our views should be chiefly directed to the cure of the general disease of the system, while local remedies only should be employed, when they appear to be local.

Besides other causes of ulcers, however, to which these parts are liable, it is proper to observe, that there is one to which they are more particularly exposed, and which appears to give rise to the greatest part of them, namely, ragged teeth. I have

have known very troublesome sores, not only produced, but kept up for a great length of time, on the sides of the tongue, and on the insides of the cheeks, by the sharp points of broken or carious teeth; and as long as the rough part of a tooth, which has once induced a sore of this kind, is allowed to remain, no remedy whatever will heal the sore. In every case, therefore, of ulcer in the mouth, we should inquire with much attention into the state of the contiguous teeth; and when any of them are rough and pointed, they should be made as smooth as possible with one of the small files, Plate L. fig. 5. or 6. Or when the sore appears to be induced by tartar upon the teeth, it should be removed in the manner I have already advised in the eighth section of this chapter.

The removal of the cause is for the most part soon followed by a cure of the sore, but when this fails, we frequently derive advantage from washing the mouth with gargles composed of decoctions of

bark,—a solution of alum,—lime-water, —infusions of red rose leaves,—of oak-bark,—and other astringents.

In some cases, however, the sores become worse, notwithstanding the use of these, mercury, and every other remedy. They become ragged and unequal about the edges; they discharge a thin, fetid sanies; and in this state are commonly attended with much pain.

As long as the sore remains small, and does not shew any tendency to spread, there is in general cause to hope that a cure may be obtained; but whenever it has assumed the appearances I have enumerated, and when it does not yield to any of the means I have mentioned, as there will be little or no cause to doubt of its being cancerous, we should advise it without further delay to be cut out.

A cancerous sore, whether seated on the tongue, or on the inside of the cheek, if it does not run deep, may be extirpated with ease and safety; but when the substance either of the cheek or of the

tongue

tongue is much affected, it becomes an object of more importance, as being attended both with difficulty and hazard. Whatever the risk may be, however, if the diseased parts can be all removed, the operation should certainly be advised: For as we know of no other remedy upon which any dependence can be placed for the cure of cancer, it is surely better to submit to some risk than be left to certain misery and death.

When a deep-seated cancer in the cheek is to be removed, the easiest and most effectual method of doing it is to make an incision through the whole substance of the cheek, commencing at the contiguous angle of the mouth, and ending at the same point, after surrounding the sore: The diseased parts being removed, the sides of the cut should be laid neatly together; and a number of gold pins being introduced at proper distances along the course of it, a cure will be completed by the twisted suture, in the manner described in Section I. of this Chapter. In this

way very extenſive cancerous ſores may be removed without leaving much deformity; while a very diſagreeable unſeemly cicatrix is always left after the uſual method of doing this operation, by removing the diſeaſed parts only, and allowing them to heal without drawing them together with ſutures.

In removing any conſiderable part of the tongue with the ſcalpel, as the hemorrhagy that enſues is the only ſymptom of hazard, the operator ſhould be previouſly provided with all the ordinary means of putting a ſtop to it. When ligatures can be paſſed round the divided arteries, no other remedy ſhould be truſted; and this, I may remark, may be done more frequently, and at a greater depth in the mouth, than is commonly imagined. As the tongue can be puſhed a conſiderable way out of the mouth, ligatures may be applied to wounded arteries, even when much of it has been taken away, merely with the common tenaculum or crooked needles; but when this does not

anſwer,

answer, it may sometimes be done in the manner I have described in Section V. Ch. X. for the removal of schirrous tonsils. A ligature being passed round the artery with the needle used in fig. 3. Plate XXXVIII. it may then be tightly twisted by passing the two ends of it through the double canula, fig. 1. Plate XXXI. or a knot may be formed upon it with the instrument, fig. 2. Plate XXXVIII.

When, however, the artery cannot be surrounded with a ligature, we must endeavour in some other manner to put a stop to the hemorrhagy. If the vessel is not large, keeping the mouth filled with astringent gargles, either of alcohol, a strong solution of alum, distilled vinegar, or water strongly impregnated with the vitriolic acid, will often answer: But when these do not succeed, the potential, or even the actual cautery, must be employed as the last resource.

The removal of any considerable part of the tongue, I must allow to be a very formidable operation: As such it has been

always considered; and accordingly it has been rarely practised. But, for the reasons that I have mentioned, I have no hesitation to say, that it is sometimes necessary, and in general that it may be done with safety. It ought not, however, to be attempted by every operator; for as it is always attended with a sudden discharge of blood, the application of means proper for the stoppage of this, obviating the effects of fainting, and other unexpected difficulties, that sometimes occur, require that steady, deliberate coolness, which a natural firmness of nerves, conjoined with much experience, alone can give.

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SECTION XIII.

Of the Division of the FRÆNUM LINGUÆ.

WE sometimes find in children at birth, that the tongue is too closely tied down to the bottom of the mouth, owing to the frænum being either too short, or continued too near to the point of it. The method of cure is obvious: This membrane or ligament must be divided so as to allow the tongue to have free motion; and it should be done as soon as it is observed to be necessary, otherwise the suckling of the child may in the first place be impeded, and afterwards an interruption to speech may arise from it.

It is proper, however, to observe, that it is not a frequent occurrence; for although nurses often speak of children being tongue-tacked, that either do not suck readily, or that are backward in speaking,

ſpeaking, yet all practitioners will allow that they ſeldom meet with it.

The diviſion of this membrane is an eaſy operation; but it muſt be done with attention, otherwiſe the contiguous blood-veſſels might be injured, by which ſuch a quantity of blood might be loſt as an infant could not eaſily bear: It is commonly done either with a ſcalpel or common ſciſſars; but it may be performed both with more eaſe and ſafety with the inſtrument, fig. 3. Plate XLIX. The child being laid acroſs the nurſe's knees, the ſurgeon ſhould open the mouth, and elevate the tongue with the index and middle finger of his left hand, while with the other he muſt introduce the inſtrument, ſo as to receive the middle of the frænum into the ſlit, which he may now divide with ſafety to any neceſſary depth.

SEC-

SECTION XIV.

Of the Divisions of the PAROTID DUCT.

THE parotid gland of each side transmits the liquor which it secretes by a duct of the size of a crow's quill, which, after passing over part of the masseter muscle, penetrates the buccinator in an oblique direction, and empties itself into the mouth about the middle of the cheek.

In the operation described in Sect. XII. of this Chapter, that of extirpating cancerous sores from the cheek, as well as by varions accidents, this duct is apt to be cut; and if the two divided ends of it be not retained together till they heal, the whole quantity of liquor which it ought to convey to the mouth is poured over the cheek; and the discharge being constantly kept up, the sore is thus prevented

ed from healing, and a fistulous opening produced, corresponding to the size of the duct. As the sore commonly heals internally, the discharge would necessarily continue during life, if means were not used for perventing it.

In recent divisions of this duct, the best practice is to lay the two ends of it exactly together, and to retain them in this situation till they unite; by adhesive plasters, when this proves sufficient; or by the twisted suture, when the retraction of the divided muscle is considerable: But when this has either been neglected at first, or fails of success, as the distant extremity of the duct soon heals, and is entirely obliterated at the divided end of it, owing to none of the fluid secreted by the gland passing through it, the only way in which a cure can be obtained is to make an artificial opening into the mouth, and to endeavour to form an union between it and the upper part of the duct leading from the gland.

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In making this passage, it ought to be carried as nearly as possible in the direction of the natural duct; but in order to ensure success, it should be rather of a larger diameter than the duct. For this purpose, a sharp-pointed perforator of a proper size should be entered on the other side of the sore, exactly opposite and contiguous to the under extremity of the superior part of the duct; and being carried with some degree of obliquity, it must in this manner be made to penetrate the mouth. This being done, a piece of leaden probe, nearly the size of the perforator, should be introduced along the course of the newly-formed opening, and retained in it till the sides of it become callous; when, the lead being withdrawn, the end of the duct should be drawn into contact with the superior part of the artificial opening by means of a piece of adhesive plaster, and kept in this situation till a firm union has taken place. After taking out the lead, we have it in our power to forward the cure,

cure, by rendering the end of the duct and of the newly-formed opening raw with the edge of a lancet or scalpel, before bringing them together. Till a firm adhesion takes place between them, the patient should be directed to live upon spoon-meat; to speak little or none; and to make as little exertion with his jaws as possible.

In this manner, sores, which would otherwise continue to discharge saliva for life, may be easily healed, with scarcely any mark of their having ever existed; of which I have now had several instances, in all of which complete cures were obtained.

A common seton or cord of cotton has been recommended for this operation instead of lead; and a bit of catgut has been used instead of it: But nothing renders the parts so quickly callous as lead; and besides, it is more cleanly than a cord or tent of any softer substance.

CHAP-

CHAPTER XV.

Of the Diseases of the EARS, *and Operations practised upon them.*

SECTION I.

Of Deafness.

DEAFNESS may proceed from various causes; for, as a free passage of sound to the Tympanum or Drum of the Ear, together with a sound state of this membrane and of the parts connected with it, are requisite for the sense of hearing, so whatever tends to obstruct the one, or to induce diseases of the other, will necessarily excite deafness.

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Two paſſages are appropriated for the purpoſe of conveying ſound to the ear; one of them termed the Meatus Externus, terminating in the external ear; and the other the Tuba Euſtachiana, ending in the throat. It is true, that the firſt of theſe is of more importance than the other, for it is larger, and more conveniently placed for collecting ſound; but it is certain, that the latter or internal paſſage is a very neceſſary part of the organ of hearing; for when by any means it is ſtopped, deafneſs, to a greater or leſs degree, almoſt conſtantly enſues. Thus we obſerve, that any preternatural fulneſs or enlargement of the amygdalæ, eſpecially when they are attacked with inflammation, is always attended with ſome degree of deafneſs. In this way, too, we account for that deafneſs to which patients are liable who have ſuffered much from venereal ulcers in the throat: and polypous excreſcences that extend back from the noſe and fauces, by compreſſing the

the Eustachian tube, are frequently productive of similar consequences.

In that variety of deafness which originates from this cause, a removal of the polypus, or swelled amygdalæ, will frequently accomplish a cure, while no other remedy can be of any avail. But when it is induced either by an ulcerated state of these parts, or by much inflammation, as the extremity of the duct will probably be obliterated, it would be in vain to employ any means of cure. It has indeed been proposed in this variety of obstruction, to endeavour to open the duct, by inserting the end of a curved blunt probe into it, or even to inject milk and water, or any other mild fluid, into it, with a curved syringe. But although a person well acquainted with the anatomy of the parts, may, by much practice, arrive at such perfection as to be able to do this with little difficulty upon a dead body, there is no reason to imagine that in practice any advantage will ever be derived from it: For even in a healthy

state of these parts, the irritation which the end of a probe or of a syringe serves to excite on being made to touch them, must be so considerable as to render every attempt for inserting them very uncertain; and the difficulty must necessarily be increased where the extremity of the duct is obstructed by disease. But if we have not much in our power in the treatment of deafness arising from this cause, we are in many instances able to afford much relief, and even to restore the most perfect hearing where it has been entirely wanting, when the disease arises from obstruction in the external passage of the ear.

The meatus externus may be obstructed in various ways. It may be in an imperforated state at birth;—it may be more or less filled with extraneous bodies forced into it;—tumors or excrescences may form in it;—and it may be too much stuffed with wax, the natural secretion of the part. As each of these causes requires a method of treatment peculiar to itself, I shall consider them under separate heads.

§ 1.

§ 1. *Of an Imperforated Meatus Auditorius.*

Among other natural deficiencies to which the human body is liable, none occurs more frequently than an imperforated ſtate of ſome of the paſſages. This does not ſo frequently happen in the meatus auditorius as in others, owing perhaps to the lining membrane of this paſſage being every where attached to bone, by which it is prevented from collapſing. Notwithſtanding, however, of this, different inſtances have occurred of it, and ſome variety is diſcovered in the nature of it.

In ſome caſes the obſtruction is formed by a thin membrane ſpread over the extremity of the paſſage; while in others a conſiderable part of the conduit is entirely filled with a firm fleſhy kind of ſubſtance.

In the treatment of this variety of deafneſs, nothing can prove uſeful but the removal of the cauſe by an operation.

When this is to be done, the patient's head ſhould be ſecured in a proper light, and at a convenient height, by an aſſiſtant; when the operator, with a ſmall ſharp-pointed biſtoury, ſhould make an inciſion of a proper length exactly on the ſpot where the external paſſage of the ear ſhould terminate. When covered by a membrane only, the operation will ſoon be finiſhed; but when impervious to any great depth, the inciſion muſt be continued, by paſſing the biſtoury in a gradual manner farther in, either till the reſiſtance is removed, or till there is reaſon to fear that the tympanum would be hurt, if it were carried deeper; in which caſe the inſtrument ſhould be withdrawn; and in order to prevent the parts from adhering together, a bit of bougie properly oiled ſhould be introduced, and retained till the cure is finiſhed; care being taken to remove it daily for the purpoſe of cleaning it, and for wiping off any matter that may have collected in the ear.

In

In this manner deafness depending upon this cause may often be removed when the obstruction lies between the tympanum and the farther extremity of the meatus externus; and it should be always attempted about the time when the child should be beginning to speak. At a more early period, the child would not be so able to bear it; and when delayed much later, it would impede his speech; for we know that dumbness depends more frequently on a want of hearing than on any other cause.

§ 2. *Of Extraneous Bodies impacted in the Ear.*

ALTHOUGH the viscid nature of the wax of the ears is well calculated for preventing dust and other foreign matters from passing into them, yet we know that much distress is in some instances induced by this cause. Children often push small peas, cherry-stones, lead-drops, and other such articles into their ears, and flies

and other insects frequently creep into them.

When these lie near to the end of the passages, flies and other things that can be laid hold of should be extracted with small forceps, such as are delineated in Plate XLVIII. fig. 2. But peas and other round bodies are more easily removed, by turning them out with the end of a curved probe, or passing the end of the instrument, Plate XXV. fig. 1. behind them; and their extraction is facilitated by a little oil being previously dropped into the passage.

When insects have got so far into the ear that they cannot be taken out with forceps, the best method of removing them is to wash them out, by throwing in quantities of warm water, or any other mild liquid, with a syringe; but as they adhere while living with considerable firmness to the neighbouring parts, we should first endeavour to kill them, by filling the ear with oil, or any other liquid that proves poisonous to them without injuring the tympanum. Lime-water, spirit of wine, and

and other liquids, might be employed for this purpose: But nothing proves so harmless as oil; and although it does not kill every species of insect instantaneously, yet few of them live if immersed in it for any length of time. The patient should therefore be desired to rest his head on the opposite side; and some tepid oil being poured into the ear, it may thus be easily kept in it as long as is necessary.

Peas and other soft bodies that swell with moisture, are apt to become so large when they remain long in the ear, that they cannot but with much difficulty be extracted entire. In this case we should endeavour to break them, either with the points of small forceps, or with a sharp small hook cautiously introduced along the passage; and as soon as they are sufficiently divided, they must either be taken out piece-meal with forceps, or washed out with a syringe.

§ 3. *Of Excrescences in the Meatus Auditorius.*

I HAVE already treated of polypi in the nose and throat; and I may now remark, that the external passage of the ear is equally exposed to them. It is not indeed common for this kind of excrescence in the ear to arrive at such a bulk as they do in the nose; but whoever has paid attention to this branch of practice, will acknowledge, that they are by no means unfrequent, and they often appear to be the cause of very obstinate deafness.

On looking into the meatus auditorius, we sometimes find it filled with a polypous excrescence hanging loose by one pedicle; while at other times the passage appears to be obstructed merely by a thickness or fulness of the lining membrane of the ear, when no particular part of it is more diseased than another.

As polypi of this part are usually of a firmer texture than polypi in the nose, and

and as the membrane of the ear is firm, and does not readily yield, they cannot easily be extracted with forceps; but they may be taken out either with the knife, or with a ligature. When they lie near to the entrance of the external passage of the ear, and can be laid hold of either with small forceps, or with the dissecting hook, Plate XXXVIII. fig. 3. they may be cut out with the probe-pointed bistoury, represented in Plate XXXIX. fig. 3.; and as they do not appear to be so vascular, as similar excrescences in the nose, they may in this manner be removed with safety; for they seldom discharge much blood. But when they lie deep, it is better to remove them with ligatures; for as the passage is strait, a knife is in this situation introduced with difficulty, and used with uncertainty.

Various methods have been proposed for applying ligatures to excrescences in this situation; but the method of removing polypi of the nose, described in the explanation of Plate XXXIII. appears to be

be the beſt. With the forked probe, fig. 2. the doubling of a ligature may be puſhed up at one ſide of the polypus till it reaches the root of it; and the two ends of the thread being carried round the excreſcence, and inſerted into a ſhort double canula, ſuch as is delineated in Plate XXXI. fig. 1. the canula ſhould then be puſhed to the root of the polypus on the oppoſite ſide; when the two ends of the ligature being drawn ſufficiently tight, and fixed upon the knobs at the end of the tube, the probe may be withdrawn, and the polypus will drop off in a day or two.

But it often happens, that theſe excreſcences cannot be removed in this manner; for inſtead of being pendulous by a ſmall neck, they frequently extend to a conſiderable depth along the lining membrane of the ear. In this caſe eſcharotics have been recommended: But as they cannot be employed but with much riſk of hurting the tympanum, they ſhould never be uſed; and this eſpecially, as the

diſeaſe

diseafe may in general be removed by means of a more fimple nature. This affection of the membrane of the ear I confider to be exactly fimilar to that variety of obftruction in the urethra in which bougies prove particularly ufeful; and the fame remedy, when duly perfifted in, proves equally ferviceable in the one difeafe as in the other. In the introduction of the bougie, care muft be taken not to pafs it to the depth of the tympanum, otherwife it may do more harm than good; and the fize of it muft from time to time be enlarged till the paffage becomes fufficiently open.

When bougies are firft paffed into the ear, they always create fome degree of uneafinefs, by irritating the parts to which they are applied; but this foon fubfides when they are ufed with caution, and properly oiled before being introduced.

§ 4.

§ 4. *Of Deafness from Wax collected in the Ears.*

WHETHER it is from the lining membrane of the ear being possessed of some degree of a contractile power, or from the outward extremity of the passage being somewhat lower than the other, that the cerumen or wax does not usually lodge in it, is perhaps difficult to determine; but it is certain, that in a healthy state of these parts they are usually very thinly covered with this secretion: Deafness in a certain degree is very commonly induced by the passage of the ear being stuffed with wax; for in this state it very effectually obstructs the passage of sound to the tympanum. It commonly happens too when wax remains long collected in the ear, that it becomes thick, and even hard, insomuch that in some instances it becomes almost as firm as a bit of timber.

The

The treatment of deafness arising from this cause is obvious. By an attentive examination of the ear, we can distinguish with certainty whether there is a superabundance of wax or not: For by placing the ear in a clear sun-shine, we can see even to the tympanum; and whenever the passage is much obstructed with wax, we should not hesitate in advising it to be removed.

Different methods have been proposed for clearing the ears of wax; but the safest and easiest is to wash or syringe them with warm water or any other mild liquid. Milk and water, or soap and water, answer the purpose: But before the operation a few drops of oil should be poured into the ear, not with a view to dissolve the wax, for more powerful solvents of this substance might be mentioned; but for the purpose of lubricating the passage, by which the wax is more easily forced out. By a proper use of the syringe, which experience alone can teach, the ears may be entirely

entirely cleared of every obſtruction produced by wax.

Although obſtruction of the external paſſage of the ear is the moſt frequent cauſe of deafneſs; yet in ſome inſtances it is produced in a different manner. It may occur from a morbid ſtate of the tympanum, and of the parts contained within it. To a certain degree it will take place, if either by accident or diſeaſe the external parts of the ear are deſtroyed; and it ſometimes occurs from a deficiency of wax.

The ſmall bones of the ears ſometimes become diſeaſed in ſcrofula, and the deafneſs that enſues from this is never in any inſtance removed. In ſuch caſes all that art can do, is to preſerve the parts clean and free from ſmell, which is moſt effectually done by waſhing out evening and morning any matter that happens to collect in the paſſage, by throwing in warm milk and water with a ſyringe: For if this be not done, the matter diſcharged from the carious bones ſoon becomes offenſive;

fensive; and it continues to be so, either till the diseased parts of the bones are entirely dissolved and discharged, or perhaps during the life of the patient.

We ought not, however, to confound this disease with a discharge that frequently takes place from the ears, of a milder nature. In some cases this appears to be the consequence of a boil or abscess in the meatus externus; while in others it takes place without any previous imposthume, and seems to be induçed by some slight inflammation of the lining membrane of the ear, or perhaps of the tympanum itself.

This is a common occurrence, and for the most part I think it is not properly treated. In general, it is supposed to proceed from morbid humours in the system; so that some risk is supposed to attend any attempt that may be made for putting a stop to it.

This, however, is wrong. In most instances the discharge may be traced to the cause I have mentioned, inflammation of

the

the membrane of the ear; which being of a local nature, no risk can ensue from checking it. And accordingly, in cases of this kind, I commonly advise injections, such as prove most useful in gonorrhœa. A weak solution of alum, or of saccharum saturni, frequently answers, or French brandy somewhat diluted. In some cases, pouring a few drops of any of these into the ears, morning and evening, proves sufficient; but when this fails, they should be gently thrown in with a syringe.

It is proper here to remark, that the more early in the disease this practice is employed, the more effectual it usually proves; so that it should never be long delayed. And besides, when the discharge has been of long duration, it not only does harm by relaxing or even destroying the tympanum, but some risk may thereafter arise from a sudden stop being put to an evacuation to which the system has for some time been accustomed. The danger, however, may be obviated by the previous introduction of an issue somewhat adequate

adequate to the difcharge from the ear, either in the head, neck, or any other part; but in recent cafes there is no neceffity for putting the patient to the inconvenience of an iffue; for here the difcharge may with fafety be ftopped immediately.

When deafnefs takes place, either from relaxation of the tympanum, or from any deficiency in the external parts of the ear, fome affiftance may be derived from our endeavouring to collect or concentrate found fo as to make a ftronger impreffion on the organ of hearing. Various inftruments have been invented for this; but none of them anfwers fo well as one nearly of the form of a common horn, fuch as is reprefented in Plate LII. fig. 2. Figure 1. is a convoluted tube employed for the fame purpofe; and fig. 3. reprefents an inftrument intended to be concealed beneath the hair or wig, and to be fixed to the head by the two ftrings connected with it.

When, again, a deficiency of wax is ſuſpected to be the cauſe of deafneſs, dropping a little oil of almonds, or any other mild oil into the ear, once or twice daily, proves ſometimes uſeful. In ſome caſes I have known benefit derived from a little ſoft ſoap being inſerted into the paſſage; which not only keeps it moiſt, but by acting as a ſtimulus to the lining membrane of the ear, it tends thus to induce a return of the ſecretion of wax. With the ſame view too, I have ſometimes employed ſtrained galbanum made into a proper conſiſtence with oil, along with a ſmall proportion of the juice of an onion.

SECTION II.

Of perforating the Lobes *of the* Ears.

BY medical writers of the 17th and preceding centuries, piercing the lobes of the ears is recommended as an operation that may prove useful in different diseases, particularly in affections of the head. In those times a small seton was drawn through the opening, with a view to induce a discharge of matter, which in some cases might prove useful. At present this operation is never employed but for the purpose of ornament.

This is perhaps the most simple of all operations; but as it is supposed to be of some importance by those on whom it is practised, it is necessary to describe it. As heavy ear-rings are apt to tear the parts, the opening should be made as high on the lobe as with propriety it can be

done; and the spot should be previously marked with ink. The patient being seated, and the head secured by an assistant, the lobe of the ear should be stretched upon a piece of cork placed beneath it. The surgeon is now to pierce it with the instrument, fig. 6. Plate LII. and having pushed it so far through that the tubular part of it is freely perceived on the opposite side, the cork must be withdrawn with the perforator stuck into it. A small piece of lead-wire is now to be inserted into the tube remaining in the ear; and on being drawn into the perforation, the lead must be left in it. By moving it daily, which may be done with little or no pain if it is previously rubbed with oil, the passage will soon become callous, and thus the operation is finished.

Before concluding the chapter on the diseases and operations on the ears, it may be expected that I should describe the method of cauterising or burning behind the ears for the toothach. At one period this

this operation was much employed, and different instruments were proposed for doing it. It is unnecessary, however, to delineate any of them; for the practice is now, I presume, very generally laid aside; and at any rate it may be done with a red hot probe of any kind equally well as with the neatest instrument. It was supposed to prove useful by burning or destroying the nerve producing the pain; but it would rather appear to act by inducing terror or surprise; and if this is the case, it is probable that the same operation would answer if practised in any other part. But as the pain attending it would by most people be considered as more severe even than the pulling of a tooth, it is not probable that it will ever be revived.

CHAPTER XVI.

Of the Wry Neck.

THE neck is ſometimes conſiderably bent to one ſide: When this takes place to ſuch a degree as to produce much deformity, the aſſiſtance of ſurgery becomes neceſſary.

The Wry Neck may be produced in various ways. It may depend upon an original mal-conformation of the bones of the neck:—On a preternatural degree of contraction in the muſcles of one ſide of the neck, particularly of the ſterno-maſtoideus muſcle:—Or, it may be induced merely by a contraction of the ſkin, in conſequence of extenſive ſores and burns.

When the vertebræ of the neck are diſtorted, it would be in vain to attempt any

any means of relief; but either of the other caufes I have mentioned feems to admit of almoft a certain removal.

In books of furgery the operation for the wry neck is very commonly defcribed; and as this deformity has in general been imagined to proceed folely from a contracted ftate of the fterno-maftoid mufcle, a divifion of this mufcle is ufually propofed as the only means to be trufted. Even Mr Sharpe was of this opinion; and he delineates an inftrument termed a Probe-razor for performing the operation *.

But were we even to admit that the divifion of this mufcle was a neceffary meafure, the method of doing it by introducing the probe-razor beneath it and dividing it afterwards, appears to be exceptionable, as being attended with much rifk of wounding the contiguous bloodveffels: It would furely be better to divide the mufcle by repeated ftrokes of a fcalpel, and to continue the incifion in a gradual

 manner

* Vide Sharpe's Surgery, Chap. xxxv.

manner to ſuch a depth as may be neceſſary; by which even the large veins of the neck might be avoided. But although we allow that a wry neck may be ſometimes produced by a contraction of this muſcle, yet it appears to be a rare occurrence: I have now met with many inſtances of this deformity, and in all of them the contraction ſeemed to be in the ſkin alone.

When the ſkin only is affected, the parts are more eaſily divided and with leſs riſk than when the deep-ſeated muſcles are to be cut; but even this ſhould be ſlowly done, ſo as to avoid the external jugular veins; for although no great harm might enſue from their being cut, they ſhould never be wounded unneceſſarily. But whether the cauſe of contraction is ſeated in the ſterno-maſtoid muſcles, or in the ſkin, the inciſion ſhould be carried ſo deep as to remove it entirely, otherwiſe little or no benefit will enſue from the operation.

We ought not, however, to conclude, that our object is accompliſhed on the contracted

contracted parts being divided; for unleſs ſome method is employed to ſupport the head during the cure of the ſore, it will ſtill be apt to incline more to this ſide than to the other, by which the parts newly divided will readily unite, ſo that no advantage will be derived from the inciſion. By Mr Sharpe and others, we are indeed adviſed to ſtuff the ſore with lint, ſo as to prevent this inconvenience with as much certainty as poſſible; but I know from experience that this does not ſucceed, and that nothing will anſwer but a firm ſupport being given to the head. For this purpoſe the inſtrument repreſented in Plate LIV. fig. 1. anſwers well: It was made for a caſe of this kind, in which it was uſed for ſeveral weeks, and with complete ſucceſs. It ſhould always be worn, not only till the ſore is healed, but for ſome time thereafter; and if properly fitted to the parts upon which it reſts, it is uſed with no uneaſineſs.

The ſkin beneath the chin is ſometimes ſo much contracted in conſequence of burns and

and other cauſes, as to draw the head conſiderably down upon the breaſt: The ſame method of cure muſt be practiſed for it that I have juſt recommended for the wry neck. The contracted ſkin muſt be freely divided with a ſcalpel, and the head properly ſupported from behind till the ſore is cicatriſed.

CHAPTER XVII.

Of Bronchotomy.

WHEN refpiration becomes much obftructed and endangers the life of the patient, and when this appears to proceed from a local affection of the fuperior part of the wind-pipe, an operation commonly termed Bronchotomy is employed for relief. But as this confifts in an opening made into the trachea, and not into the bronchiæ, it ought more properly to be named Tracheotomy.

This operation has in general been fuppofed to be of a more dangerous nature than it really is; and this has prevented practitioners from advifing it fo frequently as they otherwife would have done.— By many, it is faid to be feldom neceffary;

ry; and even ſome authors of eminence have aſſerted, "that it is uſeful only in that ſpecies of angina, where the throat is exceedingly enlarged by the ſwelling of the thyroid gland and parts adjacent." Theſe are the words of Mr Sharpe in his treatiſe on this ſubject *.—But it is evident, that in this inſtance Mr Sharpe has written without full conſideration; for, although a ſwelling of the thyroid gland may become ſo large as entirely to compreſs the trachea, and may thus render bronchotomy neceſſary, yet this is ſurely a rare occurrence; few practitioners have probably met with it; and there are not many, I preſume, who have not performed the operation on other accounts.—The danger that once was ſuppoſed to attend it is not now dreaded, and accordingly it is more frequently adviſed; but ſtill there is reaſon to think, that it ſhould be oftener practiſed than it has hitherto been.

The cauſes that may render bronchotomy neceſſary are:

1. Spaſmodic

* Operations in Surgery, Chap. xxxi.

1. Spaſmodic affections of the muſcles of the larynx, when they became ſo ſevere as to threaten ſuffocation: In ſome caſes of catarrh, the mucus of theſe parts becomes ſo acrid, as to irritate the glottis in a moſt diſagreeable manner. Even from this kind of irritation, it is evident from the ſenſe of ſuffocation, which ſometimes occurs, that much contraction is produced in the glottis: But this takes place in a more alarming degree, from hard ſubſtances of any kind paſſing below the epiglottis into the larynx; inſomuch, that from this cauſe alone, ſuffocation has, in various inſtances, happened. Among others that might be recited, a remarkable hiſtory is recorded by Bonetus, of a child having died from a piece of bone paſſing into the trachea arteria; and it has often happened, that children, and even older people, have been ſuffocated by nut-ſhells, cruſts of bread, and other ſubſtances paſſing into the trachea.

It has been alleged, that no alarming degree of contraction in the glottis can ever

ever take place; and it has even been ſaid, that the muſcles with which it is furniſhed are not adequate to this effect. This opinion, however, originates from the very relaxed ſtate in which theſe muſcles are found after death; which is not by any means a fair method of judging; for we know well, that all the muſcles in the body are after death found in a ſtate of relaxation, however ſeverely they may previouſly have been contracted.

2. A piece of bone, fleſh, or any other firm ſubſtance, being lodged in the pharynx, or in the upper part of the œſophagus, and too large to paſs down to the ſtomach, may by its bulk compreſs the poſterior and membranous part of the trachea in ſuch a manner as to produce a total obſtruction to the paſſage of air into the lungs. Different inſtances have occurred in this place of ſuffocation being induced by a piece of fleſh lodging in the ſuperior part of the pharynx; for in ſuch inſtances, it commonly happens that patients are irrecoverably dead before any

aſſiſtance

aſſiſtance can be procured. I have myſelf met with ſeveral inſtances of this, in all of which the utmoſt certainty was obtained of reſpiration having been obſtructed for a few minutes only; and yet none of the people recovered, although all the means uſually employed in ſuch caſes were immediately put in practice. But in all there was reaſon to think that bronchotomy would have proved effectual, had it been poſſible to procure more ſpeedy aſſiſtance.

The event of theſe caſes, as well as of ſome others of drowned perſons, in whom reſpiration had been obſtructed for a very ſhort period only, and in whom every method now known was put in practice for their recovery, makes me conclude, that few, if any, have ever recovered in whom reſpiration has been totally obſtructed for more than a few minutes.

After all the attention that I have been able to give to caſes of this kind, I would ſay, that complete interruption to breathing, for the ſpace of five minutes only, muſt,

muſt, in perhaps every inſtance, prove fatal. We have heard indeed of the recovery of many drowned people after they had been half an hour, nay even hours, under water; but theſe accounts of the time which bodies have remained immerſed are ſeldom accurately obtained, from the general inclination in byſtanders to exaggerate, as well as from other cauſes; ſo that little or no credit is in general due to them.

3. Polypous excreſcences in the noſe have been known to fall ſo far into the pharynx as to endanger ſuffocation; and it very commonly happens, that theſe tumors, which originate either from the uvula or from the ſuperior part of the pharynx, are attended with this effect; in all of theſe, when extirpation with a ligature is to be attempted, if the tumor is large, it is with much difficulty that the neceſſary apparatus is applied. This, however, may be much facilitated by a previous opening of the trachea, which admits

mits of eaſy reſpiration while the ligature is forming round the baſe of the tumor.

4. Tumors that are firm, particularly thoſe of the ſchirrous and fleſhy kinds, even when ſeated externally, have been known to compreſs the trachea ſo much as almoſt entirely to obſtruct reſpiration: When ſo ſituated as to cover all the acceſſible part of the trachea, which, in the latter ſtages of the tumor termed Bronchocele, is too frequently the caſe, this operation is inadmiſſible; but much benefit may be derived from it whenever it can with ſafety be performed.

5. An inſtance is mentioned by Dr Richter, of an inflammation of the tongue arriving at ſuch a height as entirely to obſtruct the paſſage to the fauces; and different inſtances have occurred of mercurial ſalivations, when carried too far, inducing ſuch a tumefied ſtate of the glands in the mouth and throat, as to be attended with the ſame effect. In one caſe that I met with ſeveral years ago, and in which the glands of the throat were naturally

large, ſuch complete obſtruction was produced to the paſſage of the air, as required the aid of this operation to ſave the patient. In this inſtance, ſuch a quantity of mercury had been quickly thrown in, that the ſwelling of theſe glands arrived at an alarming height in the ſpace of a few hours from its commencement; and although all the remedies uſually employed in ſuch caſes were put in practice, none of them had any effect: The operation was, contrary to my opinion, delayed till the patient was almoſt completely ſuffocated; but he revived inſtantly on the perforation being made.

6. Swellings of the amygdalæ and contiguous parts, which do not terminate ſpeedily in ſuppuration, when they become large are apt to induce an obſtructed reſpiration; and may thus render bronchotomy neceſſary. It is not ſuch tumors, however, as originate entirely from inflammation that moſt frequently come this length: Hard ſwellings of the amygdalæ, when attacked with inflammation,

are

are ſometimes known to produce ſuch tumors in the fauces as entirely ſhut up the paſſage, which none of the uſual remedies will remove; and which, therefore, require the aid of this operation. But in real inflammatory tumors of theſe parts, conſtituting the angina inflammatoria of authors, unleſs the glands have been morbidly enlarged before the commencement of inflammation, the ſwelling will ſeldom or perhaps never, proceed to ſuch a height as to require it. When ſwellings of this kind arrive at a large ſize, we almoſt conſtantly find, that they do ſo from their having gone into a ſtate of ſuppuration, when relief may be obtained by means of a more ſimple nature than bronchotomy, namely, by diſcharging the matter contained in the tumor by an inciſion or a puncture. A common ſcalpel or biſtoury, wrapped up with a piece of linen near to the point, is generally uſed for puncturing the amygdalæ and other parts of the fauces; but no precau-

tion whatever will render this a ſafe inſtrument for theſe purpoſes. In Plates XL. and LVII. are repreſented different forms of canulas containing concealed lancets, which every ſurgeon ought to have, as by means of them any part of the throat may be ſcarified with ſafety.

7. Among the means employed for reſtoring the circulation in people who have been long under water, or where reſpiration has been obſtructed in any other manner, blowing air into the lungs, and repeatedly diſcharging it, is, perhaps, more to be truſted than any other; for, the action which is thus given to the lungs is readily communicated to the heart itſelf. The uſual method of throwing air into the lungs in ſuch caſes, is by blowing forcibly into the mouth while the noſtrils are compreſſed; or by means of a curved tube inſerted at one of the noſtrils, ſo as to make its extremity terminate immediately above the glottis.

But, although one or other of theſe methods may, in ſome inſtances, anſwer the

purpoſe

purpoſe of filling the lungs with air, yet I know from experience, that it will not commonly ſucceed. In different inſtances of people who had been a few minutes under water, ſeveral attempts of this kind were made for throwing air into the cheſt; but, either from ſome contraction of the epiglottis, or of the ſuperior part of the larynx, none of them were found to ſucceed; and, as bronchotomy was in both caſes obliged to be performed for effecting it, I am therefore warranted in mentioning this as one cauſe that may render it neceſſary.

When, from any of theſe cauſes, reſpiration becomes ſo much obſtructed as to endanger the patient's exiſtence, bronchotomy ſhould be immediately adviſed; and the method of performing it is this.

Whenever it is neceſſary to have a patient firmly ſecured during an operation, he ſhould always be placed upon a table; and as this is a matter of much importance in bronchotomy, a table ſhould be preferred to a chair. The patient

being laid upon a table, with his head drawn back and limbs ſecured by aſſiſt-ants, a longitudinal inciſion ſhould be made with a ſcalpel, through the ſkin and cellular ſubſtance on the middle and inferior part of the trachea, beginning at the inferior part of the thyroid cartilage, and proceeding downwards for the ſpace of an inch. The ſterno-thyroidei muſcles are thus brought into view; and being ſeparated from one another, a conſiderable portion of the thyroid gland is in this manner laid bare. As this gland is plentifully ſupplied with bloodveſſels, and as the diviſion of any of theſe proves always troubleſome, and in ſome inſtances even dangerous, it ſhould with much attention be guarded againſt. This may commonly be eaſily done, by avoiding the inferior portion of the gland, where the two lobes of which it is compoſed unite, and finiſhing the operation at the upper part of it where they ſeparate. In order, too, to guard as much as poſſible againſt the inconvenience ariſing from the

the diviſion of the arteries of this gland, the inciſion ſhould be ſlowly made; and, as the arteries are of ſuch magnitude as to be perceptible to the naked eye, they may, with due care, be avoided.

The cellular ſubſtance lying between theſe portions of the gland being cautiouſly removed, the trachea is thus laid bare; and if no large bloodveſſel has been divided, the operation may be immediately finiſhed, by making an opening between any two of the cartilages; but if any large artery has been cut, it muſt be ſecured with a ligature before going further. Authors differ much in their opinion of the beſt manner of finiſhing this part of the operation. By ſome we are deſired to make an opening with a ſcalpel, while others prefer the point of a lancet; and by all, the perforation is adviſed to be of ſuch a ſize as to receive a tube or canula of ſilver, through which a quantity of air may be tranſmitted fully ſufficient for the purpoſe of reſpiration; but, as much miſchief enſues from blood

getting into the trachea, by the convulſive cough which it induces; and as this can ſcarcely be prevented in the uſual manner of performing the operation, it has been propoſed to employ a cutting inſtrument adapted to a canula of a proper ſize for being left in the opening. Deſcriptions of inſtruments for this purpoſe may be met with in the works of the ingenious Dr Richter of Gottingen *, to which I have already referred, and alſo in the fourth volume of the Memoirs of the Royal Academy of Surgery of Paris, by Mr Bauchot.

An inſtrument which I conſider as an improvement upon theſe, with which I have twice performed this operation, is delineated in Plate XXIII. fig. 3. It is nearly of the form of a flat trocar, but not quite ſo long. The patient's head being ſtill ſupported and ſomewhat drawn back, the point of the ſtilette muſt be made to penetrate

* Vide Auguſti Gottlieb Richteri D. Medicinæ Profeſſoris Gottingenſis, Obſerv. chirurg. Faſcicul. ſecund. cap. iii.—Gottingæ 1776.

penetrate the membrane between two of the cartilages; and the extremity of the canula being puſhed fairly into the trachea, the ſtilette is to be withdrawn, and the canula afterwards ſecured, by a piece of tape connected with it being tied on the back of the neck.

The inſtrument is here repreſented without encumbrances from the dreſſings; but before being introduced, it ſhould be paſſed through the centre of three or four thin compreſſes of linen: Theſe not only ſerve to cover the pledget of emollient ointment with which the wound ſhould be protected after the ſtilette is withdrawn, but by withdrawing one or more of them, which may be eaſily done without moving the inſtrument, merely by cutting up their ſides with a pair of ſciſſars, the length of the canula may thus be augmented at pleaſure; and which, in the event of the parts about the wound becoming ſwelled, is found to be a very important precaution; for, when neglected, a very ſlight tumefaction on the ſides of the

the ſore will throw the canula out. The canula ſhould, therefore, be always of ſuch a length as may obviate the inconvenience that might enſue from this acceſſion of ſwelling. For this purpoſe, it ſhould never be leſs than two inches long: When firſt introduced, juſt as much of its extremity ſhould be left uncovered by the compreſſes as admits of its paſſing eaſily into the trachea. If any ſwelling takes place, one, two, or more plies of the linen being cut off, will ſtill admit of the canula penetrating to the ſame depth; and, on the contrary, when it happens that the parts are ſwelled at the time of the operation, as the quantity of tube lodged in the trachea might be too much increaſed on the ſwelling being removed, the inconvenience that would otherwiſe enſue may be eaſily prevented, by ſome additional plies of linen being inſerted between any two of the compreſſes.

On experience we find, that a double canula anſwers beſt in this operation. When one tube only is uſed, it is apt to fill

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with mucus; and as it muſt frequently be taken out for the removal of this, reſpiration is in the mean time apt to be impeded: But when a double tube is employed, the inner canula can be eaſily removed, cleaned, and replaced, while every inconvenience that would otherwiſe reſult from it is prevented by the other being left in the opening. When, therefore, the outer canula of the tube is properly fixed, the other having been previouſly adapted to it, and the opening in the canula covered with a piece of crape or fine muſlin, to prevent the admiſſion of duſt, the operation is in this manner completed.

As the intention of this operation is to obviate the inconveniencies ariſing from an obſtructed reſpiration, it is evident that the canula ſhould be continued in the wound as long as the cauſe that firſt gave riſe to it exiſts. If a piece of bone or any other ſubſtance has paſſed into the trachea, and if this cannot be extracted at the opening newly made, a curved probe ſhould be introduced at it, in order to aſcertain

aſcertain the ſituation of the extraneous body; and this being done, another perforation muſt be made directly above it. In this manner, this cauſe of the diſeaſe may, in ſome inſtances, be removed, and when obſtructions of a different kind are found to take place, the means beſt adapted for their removal ſhould be immediately exployed. But till the breathing becomes perfectly eaſy, the canula muſt be continued; and when at laſt it is judged proper to withdraw it, the ſkin ſhould be immediately drawn over the orifice, and retained there with a piece of adheſive plaſter, by which means a cure of the ſore will ſoon be obtained.

Dr Richter, among other improvements which he propoſes upon this operation, adviſes the canula to be curved; but, in the different inſtances in which I have had occaſion to perform it, none of the inconveniencies occurred which the Doctor ſuppoſes may proceed from employing a ſtraight one: I have found indeed that the ſtraight canula anſwers every purpoſe; and

and as a curved tube cannot have another exactly fitted to it to be occasionally inserted and withdrawn, this I think is a sufficient reaſon for not adopting the curved canula of Dr Richter.

To ſuch as have not had opportunities of performing this operation, the attention that I have adviſed, to a proper regulation of the length of the canula, may appear to be unneceſſary. This, however, is far from being the caſe; and much embarraſſment would enſue from the neglect of it. The means that I have recommended for this purpoſe are ſimple, are at all times eaſily procured, and, upon trial, I have found that they anſwer the purpoſe: But a very neat and ingenious contrivance for the ſame intention has long been exhibited by Dr Monro in his courſe of ſurgery; and of which he has been ſo obliging as to admit of a delineation being here given. It is repreſented in Plate LVI. fig. 1.

CHAP.

CHAPTER XVIII.

Of Oesophagotomy.

SUBSTANCES are frequently taken into the pharynx, which, in paſſing into the œſophagus, are too bulky to be forced down to the ſtomach by the muſcular exertion of the parts at which they ſtop. When any part of ſubſtances in this ſituation can be obſerved on looking into the pharynx, they are in general eaſily removed with common forceps; but when they have paſſed entirely out of the pharynx, and are lodged deep in the œſophagus; this cannot be done, and in ſuch circumſtances we are obliged either to allow the ſubſtance to remain where it is fixed; to puſh it into the ſtomach; or to extract it by laying the œſophagus open.

When

When the ſubſtance reſting in the œſophagus is of a ſoft texture, ſuch as bread, cheeſe, or even fleſh, the eaſieſt and beſt method of getting free of it is, to puſh it into the ſtomach with an inſtrument termed a Probang, Plate LVII. fig. 1. and 2. This is much ſafer and eaſier than to attempt to bring it up, as is frequently adviſed, by a ſtrong emetic; for when this does not ſucceed, the exertion of vomiting in this obſtructed ſtate of the œſophagus is very apt to do harm.

But when a pin, a piece of ſharp bone, or any other firm ſubſtance, is fixed in the paſſage, we ſhould by no means attempt to puſh it down; for, by doing ſo, if it does not go into the ſtomach, any point or roughneſs with which it is furniſhed, might be puſhed directly into the ſubſtance of the œſophagus, as in ſeveral inſtances I know has happened.

I think it neceſſary to obſerve, that this is a point of importance, and ought therefore to meet with attention. In every caſe of obſtruction of the œſophagus,

gus, arising from a foreign body being fixed in it, it is almost the universal practice to endeavour to push it into the stomach. When the obstructing substance is of a soft yielding nature, such as bread, or a piece of flesh, this may commonly be done with safety; but for the reason that I have given, it will very frequently do mischief when it is hard. In every case, therefore, where the pain is not great; if the breathing is not much affected; and the passage still so pervious as to permit the food to get down to the stomach, no attempt should be made for removing it; for we know from experience, that, in most instances, every thing of this kind is at last carried down, either by the action of the œsophagus itself, by some degree of dissolution taking place in the substance lodged in it, or by some partial suppuration forming in the œsophagus, by which that part of the extraneous body that was fixed in it becomes loose.

But where the obstruction is so complete as to prevent the passage of nourish-

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ment to the ſtomach, or when the breathing is much interrupted, if the cauſe of obſtruction cannot be removed by other means, it comes to be a queſtion whether any attempt ſhould be made for taking it out by an inciſion. As the œſophagus lies deep, being covered with the trachea, and as different bloodveſſels and nerves of magnitude and importance lie near it, it has always been very juſtly conſidered as dangerous to make an inciſion into it; and, in general, it has been laid down as an eſtabliſhed maxim never to attempt it.

But although no practitioner would think it adviſable to perform this operation without ſome reaſon of importance, yet in ſuch inſtances as thoſe to which I allude, where much danger muſt enſue from any material interruption being formed, either to the paſſage of food to the ſtomach, or of air into the lungs, it would ſurely be preferable to give the patient a chance, even from this doubtful remedy, than to allow him to meet a certain and miſerable death.

 Notwithſtanding

Notwithſtanding a very general prejudice that prevails againſt this operation, I think we are ſufficiently warranted in recommending it in thoſe cauſes of obſtructions in the œſophagus that cannot be otherwiſe removed; and the opinion is founded on the following circumſtances: Wounds in the œſophagus, whether inflicted by accident or deſign, have been frequently cured, different inſtances of which have fallen within my own knowledge, the moſt remarkable of which was the caſe of a man, who, in an attempt to deſtroy himſelf, cut the trachea on the right ſide completely through, and likewiſe penetrated the œſophagus; and among other inſtances recorded by authors of wounds in the œſophagus being cured, one is mentioned by Bohnius; in which, from the food paſſing freely out at the wound, it was evident, that the œſophagus was injured, and yet a cure was eaſily accompliſhed.

By various experiments, this operation is found to be ſafely practicable on dogs and

and other animals, in which the ſtructure of the parts concerned is nearly the ſame as in the human body: It has been repeatedly done on the dead ſubject, without any injury to the contiguous large bloodveſſels or nerves; and, laſtly, there are at leaſt two inſtances upon record, of its having been performed with ſafety and ſucceſs on living ſubjects *. I have therefore no heſitation in ſaying, that caſes may occur in which it may be proper to cut into the œſophagus.

Beſides thoſe obſtructions ariſing from the cauſes that I have mentioned, inſtances ſometimes occur of the œſophagus being ſo completely ſtopped by conſtrictions and tumors, that all communication between the mouth and the ſtomach is cut off.

When the ſtricture is ſeated in the ſuperior part of the œſophagus, making an opening into it may, in ſome inſtances, be ſometimes adviſable, with a view to

* Vide Mémoires de l'Academie Royale de Chirurgie, tom. iii. p. 14. Paris, 1756.

the conveyance of nouriſhment into the ſtomach: Any advantage, however, to be obtained in ſuch caſes from the operation, will in general prove only temporary, as diſeaſes of this kind have hitherto reſiſted every attempt that has been made for removing them.

By many anatomiſts the œſophagus is repreſented as lying evidently to the left ſide: If it ſtretches, however, to the left, it is in a very inconſiderable degree; but this conſideration may render it proper to prefer the left ſide for this operation; the method of performing which is this: The patient being ſecured in the manner I have deſired for Bronchotomy, and his head drawn back and kept firm by an aſſiſtant, an inciſion ſhould be made with a ſcalpel, at leaſt two inches in length, directly through the ſkin and cellular ſubſtance, keeping cloſe by the ſide of the trachea, and commencing about half an inch above the ſeat of the obſtructing ſubſtance when this can be done; and where this is impracticable, by the obſtruction being

being within the cavity of the cheſt, the inciſion ſhould commence about an inch and a half above the breaſt-bone.

The cellular ſubſtance being freely divided, the ſterno-thyroidæi and ſterno-hyoidæi muſcles, together with a portion of the thyroid gland, will be brought into view: With a flat blunt hook, one aſſiſtant ſhould pull the muſcles gently to the left ſide, while another by the ſame means is employed in pulling the trachea ſomewhat to the right, ſo as to admit of the œſophagus being brought into view. If any large bloodveſſel is thus unavoidably divided, it ſhould now be ſecured with a ligature; and this being done, the operator is to proceed to open the œſophagus. When the piece of bone or other ſubſtance fixed in the paſſage is diſcovered by the finger, the perforation ſhould be made directly upon it, and the cut, which ſhould always be longitudinal, being made of a ſufficient ſize for extracting it, this ſhould be immediately done with ſmall forceps. But when the cauſe of obſtruc-

tion is found to lie within the cavity of the cheſt, which muſt add greatly to the hazard of the operation, the œſophagus ought in this caſe to be opened immediately above its entrance into the cheſt; care being taken, in order to give ſufficient room for what is to follow, that the opening in the œſophagus be extended upwards to the full height of the external inciſion. This being done, a large firm probe ſhould be introduced, in order to determine the ſeat of the obſtruction, when by means of long ſmall forceps, the ſubſtance producing the miſchief ſhould be cautiouſly laid hold of, and ſlowly extracted.

The operation being in this manner finiſhed, all our attention is to be given to the treatment of the ſore, and nouriſhment of the patient. When the operation is performed for ſome diſeaſe in the ſuperior part of the œſophagus, till this is either removed by medicines, or by an operation, which in caſes of compreſſion from tumors may ſometimes be done, our principal

cipal object is the conveyance of nourishment to the stomach: In such instances, there is a necessity for preserving the opening in the œsophagus. But when the operation has been performed for the purpose of removing a foreign substance fixed in the passage, as soon as this is accomplished, nothing should be omitted that can tend to promote an immediate reunion of the divided parts. If, in such circumstances, the patient is allowed either to eat or drink much, the opening in the œsophagus will be found difficult to heal, and may become fistulous. It will therefore be more prudent to recommend total abstinence from solid food for several days, and to convey nourishment, in the form of strong soups, by the anus, and allowing very small quantities of milk or soup to be swallowed from time to time: By preventing the patient from moving his neck, and treating the wound in the same manner with similar affections in other parts, we know from experience, that a cure may at last be obtained; and, at any rate, if this should not

 happen,

happen, and if the wound ſhould remain fiſtulous, or even if death ſhould ſucceed, ſtill the operator will have the conſolation of having attempted every probable means for the ſafety of his patient. In addition to what I have already obſerved of the propriety of this operation in particular caſes, I may remark, that the hazard attending it is not ſo great as is commonly imagined. If the inciſion is made in the manner I have directed, cloſe by the ſide of the trachea, no injury can be done to any of the larger arteries or veins: The only bloodveſſels we have to be aware of, are thoſe branches of the laryngeal artery that ſupply the thyroid gland. With proper caution, the principal arteries of the gland may in general be avoided; but if any of them ſhould be divided, they may commonly be ſecured with ligatures, eſpecially if the external inciſion is ſufficiently free: In proceeding with caution too, that branch of the eighth pair of nerves, which from its inverted direction has been termed the Recurrent Nerve,

and

and which runs close by the side of the œsophagus, may in general be avoided; and even in the event of some branches of this nerve being divided, the only bad consequences that probably would ensue, would be some degree of weakness in the voice; for the muscles of the larynx, in which they are chiefly spent, do not depend entirely upon them.

CHAP-

CHAPTER XIX.

Of Diseases *of the* Nipples.

THE Nipples are in some cases so deeply sunk in the breast, that a child in attempting to suck, finds it difficult or even impossible to lay hold of them.

To remedy this inconvenience, different means are employed. If the prominent part of the breast can be pressed so far back as to uncover even a small part only of the nipple, it may commonly be drawn out by getting a stout child of six or eight months old to suck it: But as this cannot be always done, glasses of different kinds are employed for the purpose. In Plate LIII. figures 1. and 3. are represented two forms of glasses with which the breast may

may either be ſucked by the patient herſelf or by an aſſiſtant; and fig. 2. is a glaſs cup mounted with a bag of elaſtic gum. In uſing this, the air muſt be preſſed entirely out of the bag, when the cup being placed upon the breaſt ſo as to include the nipple, ſuch a degree of ſuction is produced as very commonly draws it out. The bag, however, ſhould be much larger than uſual, otherwiſe it does not act with ſufficient force. But whichever of theſe means is employed, it ſhould be continued till the nipple is drawn fully out; and always repeated before the child attempts to ſuck.

The nipples, like every other part of the body, are liable to ulcerations; but from their peculiar delicacy, any ſores with which they are attacked, are always productive of much diſtreſs, while the ſucking of the child tends not only to render them worſe, but of much longer duration than they otherwiſe would be. Cracks or chops in the nipples have not a formidable appearance, but they are commonly

monly much more painful than ulcers of the greateſt extent in other parts of the body.

Various remedies are employed for theſe affections, but emollients are moſt frequently uſed: I have not found, however, that they ever give permanent relief; for although they may procure temporary eaſe, it ſeldom or never proves of long duration. Mild aſtringents and drying applications prove more uſeful. As a waſh, lime-water, weak ſaturnine ſolutions, and ſolutions of allum, prove ſerviceable; and Port-wine and water, or brandy ſufficiently diluted, may be employed for the ſame purpoſe. After bathing the parts with one or other of theſe, the nipple ſhould be covered with ſoft lint, ſpread with Unguentum Nutritum, or Goulard's cerate; but of theſe the firſt is the beſt: I have often uſed it with advantage, and I know of nothing that anſwers ſo well in chops or cracks wherever they are ſituated. It is proper, however, to obſerve, that the nipple ſhould be entirely cleared of this application al-

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ways before the child is allowed to ſuck; for as lead forms the moſt important part of it, miſchief might enſue from much of it being carried into the ſtomach.

Till the nipple is completely healed, the child ſhould not be allowed to ſuck oftener than is quite neceſſary; and when one of the nipples only is ſore, this may be eaſily managed, as the child may be kept at the ſound breaſt, while the other is drawn from time to time with a glaſs which does not injure the nipple. In Plate LIV. fig. 2. 3. and 4. ſmall cups are delineated for protecting the nipples during the cure. When properly fitted to the parts, they not only protect them from the friction of the clothes, but allow the milk to run off as quickly as it falls from the breaſt.

CHAP.

CHAPTER XX.

Of the Amputation of Cancerous Mammæ.

CANCER has been known to attack almost every part of the body; but we meet with it more frequently in the breasts of women than in almost any other part.

In Chapter II. Section VIII. I entered fully into the consideration of cancer: I have now, therefore, to refer to that part of the work for the description and diagnosis as well as for the medical treatment of the disease; and in this chapter, I shall chiefly adhere to the removal of cancerous tumors of the mammæ by amputation.

A real cancer is perhaps the most formidable disease to which the human body is liable: Wherever it is seated, its consequences

ſequences are to be dreaded; but more eſpecially when fixed on one or both of the mammæ. Various cauſes have been aſſigned for cancer proving more malignant in this ſituation than in others; but the obvious reaſon of it is, that cancers being very commonly ſeated in glands, and the breaſt being entirely glandular, cancer is neceſſarily more apt to form in it than in parts not ſo extenſive.

In Chapter II. Section VIII. I endeavoured to ſhew, that cancer, on its firſt appearance, is perhaps, in every inſtance, a local diſeaſe; that the cancerous diatheſis is produced, not by any original diſeaſe in the conſtitution, but by abſorption, from a local ulcer; and hence I obſerved, that cancerous ſores ſhould be removed by immediate amputation, wherever this can be done.

This, I think, ſhould be an eſtabliſhed maxim in the treatment of cancer whereever it is ſituated; but from its being more apt to infect the conſtitution, when ſeated on the mammæ than on other parts

of

of the body, this is an additional reafon for early amputation in cancer of the breaft.

As every fchirrous gland in the mammæ is apt to degenerate into cancer, and as indurations of the mammæ have hitherto refifted the effects of every other remedy, early amputation fhould in every inftance be advifed: This, I know, is a point with refpect to which practitioners are not agreed; fome having alleged, that, as fchirrous glands in the mammæ have been known to remain in an indolent, inoffenfive ftate for a great length of time, their removal fhould never be advifed till they have actually gone into a ftate of ulceration.

But this opinion, which is evidently founded in timidity, has been the caufe of much unneceffary diftrefs to a great proportion of all by whom it has been followed; while it has ferved to bring the operation of amputating cancerous breafts into a degree of general difcredit, which it does not merit. There is no fact of which

which I am more convinced, than that many more would recover by means of the operation, were it employed in a more early period of the diſeaſe, particularly while the glands are ſtill in a ſchirrous ſtate, and before any matter is formed in them: and as inſtances of their remaining long in an indolent ſtate are exceedingly rare, no dependence ſhould ever be placed on their doing ſo.—It is not a ſingle inſtance or two, in matters of ſuch importance, on which an opinion ought to be formed: It is the reſult of general obſervation that ought to direct us; and every unbiaſſed practitioner muſt confeſs, that what I have here aſſerted reſpecting this matter is, at leaſt in general, well-founded.

The propriety of amputating ſchirrous breaſts early being admitted, and the practice eſtabliſhed, it may poſſibly happen in a few inſtances, that ſchirrous tumors of this part may be removed, which might have remained in an indolent ſtate for ſome time longer. But as this would not

frequently be the caſe; as we have no means by which we can judge with certainty, between ſuch caſes as might remain for ſome time in this indolent ſtate, and thoſe which might proceed more rapidly; and eſpecially, as the advantages derived from early amputation are unqueſtionably great; no heſitation ſhould occur in putting it univerſally in practice.

When practitioners, therefore, have an opportunity of amputating cancerous or ſchirrous breaſts early, they ought always to embrace it. It often happens, however, from an improper delicacy in patients, as well as from other cauſes, that practitioners are not conſulted till the diſeaſe is far advanced. But, although the advantages to be derived from the operation will, in general, be in proportion to the previous duration of the diſeaſe; yet on all occaſions, even in very advanced ſtages of cancer, it is right to adviſe it, provided the parts affected can be completely removed. When this cannot be accompliſhed, from the

the cancerous parts lying too deep, or being immediately connected with organs essentially necessary to life, by which amputation of the one cannot be performed without much injury being done to the other; in such circumstances, as the operation would not be of any real utility, it should not be advised; for, as all the diseased parts could not with propriety be removed, and as the cancerous virus is of a very assimilating nature, it would answer no beneficial purpose to amputate only a portion. But in every instance where the diseased parts can be safely separated from the sound, as nothing but their removal can afford any chance of safety, I must again say, that we should not hesitate to advise the operation. I shall now proceed to describe the method of performing it.

In every chirurgical operation it should be an established maxim to save as much sound skin as possible. Such portions of the common teguments as are diseased, or that adhere firmly to the parts below,

ought certainly to be taken away; but it can never be proper to remove more than this: For it is now univerſally known, that the cutis vera is never regenerated; and when deſtroyed, that the parts underneath are afterwards covered with thin ſcarf-ſkin only. This, however, is not the only objection to an extenſive removal of ſkin: In every operation where much of it is deſtroyed, the wound that remains is neceſſarily much more extenſive, and the cure therefore more tedious, than when little, or perhaps no ſkin has been taken away. Indeed, this is ſo much the caſe, that in operations where no ſkin has been removed, cures will be ſometimes accompliſhed in a few days, which, by the removal of much ſkin in the uſual way of performing the ſame operation, would be protracted to many weeks or months.

This practice of removing much ſkin in the amputation of tumors, ſeems to have originated from an idea that has long and very univerſally prevailed, of the ſkin being

being by much diſtention apt to loſe its tone ſo entirely as not to be able to recover it again; and therefore, that in every ſuch inſtance, a conſiderable part of it ſhould be taken away. This, however, is by no means the caſe; and whoever will adopt a different practice, will find, that tumors rarely or never become ſo extenſive as to deſtroy the elaſticity of the ſkin that ſurrounds them.—Inflammatory tumors, indeed, proceed frequently with ſuch rapidity to a large ſore, as to diſtend the ſkin more quickly than it can properly bear, and at laſt burſt it entirely when ſuppuration takes place: But in almoſt every other variety of tumor, the progreſs of the ſwelling is ſo ſlow and gradual, that the natural contractile power of the ſkin is ſeldom or never ſo far deſtroyed by it, as to prevent it from recovering its tone on the cauſe producing the diſtention being removed: And in caſes of ſchirrous breaſts, this contractile power of the ſkin is commonly ſo remarkable, that, even when the breaſt is much enlarged, and all

the glandular part of it removed, the ſkin, if it has been preſerved, almoſt conſtantly contracts to the ſize of the remaining ſore; ſo that, in all ſuch caſes, none of the ſkin ſhould be removed that is not either actually diſeaſed, or adhering ſo firmly to the parts below, that it cannot be eaſily ſeparated.

In proceeding to the operation, the patient muſt be either firmly ſeated in an arm-chair, her head being ſupported with a pillow by an aſſiſtant behind, whilſt her arms are properly ſecured by an aſſiſtant on each ſide; or ſhe may be placed upon a table, which anſwers better than any other poſition: In this manner ſhe is more eaſily ſecured; faintings are leſs apt to occur; and the ſurgeon proceeds with more eaſe through every part of the operation, than when the patient is ſeated in a chair. But in whatever poſition ſhe may be placed, the ſurgeon ſhould for certain be ſeated: Surgeons, indeed, perform this operation moſt frequently while ſtanding before the patient; but no operator will ever

ever attempt it in this manner, who has once experienced the advantages that refult from doing it in the manner I have advifed.

In the firft place, I fhall fuppofe the operation to be performed for a fchirrus of the mamma, while the fkin is ftill found, and without adhering to the parts beneath. In thefe circumftances, an incifion fhould be made with a fcalpel through the fkin and cellular fubftance, from one extremity of the tumor to the other; taking care to direct the fcalpel fo that it may avoid the nipple, by carrying it an inch or fo to one fide of it. When the difeafe has extended, as it fometimes does, beyond the mamma towards the fternum, as this commonly throws the longeft diameter of the tumor acrofs the body, this external incifion fhould run in a direction correfponding to the length of the tumor, by making it to commence at one fide of the mamma, and terminate at the other; but when the mamma alone is difeafed, the external incifion fhould run in a perpen-

dicular direction, commencing at the upper part of the tumor, and finiſhing at the moſt depending point of it. By this means, any matter that may form during the cure is freely diſcharged; which does not happen when the inciſion runs in a tranſverſe direction, unleſs the inferior portion of the teguments is afterwards divided from above downwards; which, in ſuch caſes, ſhould always be done: For although, in ſome inſtances, a cure is eaſily obtained, even where this precaution is not kept in view, yet, in general, ſome inconvenience would enſue from the neglect of it.

The ſkin and cellular ſubſtance being thus freely divided, are now to be ſeparated from the diſeaſed parts below by a ſlow and ſteady diſſection; and this being accompliſhed, the teguments ſhould be kept aſunder by aſſiſtants, till all the glandular part of the breaſt is diſſected from the pectoral muſcle and other parts with which they are connected. With a view to preſerve the pectoral muſcle as much as poſſible from being cut by the

ſcalpel,

ſcalpel, the arm of the affected ſide ſhould be kept extended ſomewhat above a horizontal direction; by which means all the fibres of this muſcle are preſerved in a ſtate of extenſion, and are thus leſs liable to be injured during the operation than when they are kept relaxed.

It often happens, indeed, that the diſeaſed parts adhere to the pectoral muſcle; and, in ſome inſtances, even to the perioſteum of the ribs. In ſuch caſes, as all the diſeaſed parts muſt be removed, we ſhould not heſitate to uſe every neceſſary freedom with the pectoral muſcle, as well as with every other part to which the mamma adheres; but whenever the removal of the diſeaſe can be accompliſhed without injuring theſe parts, it ought undoubtedly to be done.

On the mamma being removed, the operator ſhould examine with much accuracy, not only the ſurface of the ſore, but the parts beneath the edges of the divided ſkin; and if any indurated glands are diſcovered, they ſhould all be removed.

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In this part of the operation, much care and attention is requisite; for unless all the diseased glands are removed, no advantage will be derived from it.

I have desired that the whole glandular part of the mamma should be removed. Even where a small portion of it only is diseased, the whole should in general be taken away; for no good purpose can be answered by a portion of it being left; and in many instances where this had been done, mischief ensues from the disease making its appearance again in some part of the glands which remain. When indeed it is found that a single loose gland only is diseased, it may be taken out without injuring the rest of the breast; but whenever the disease is extensive, the whole mamma should be removed.

The next step in the operation is to secure the divided arteries, and it should always be done with the tenaculum. As the arteries of the mamma are frequently small and numerous, much attention is necessary to discover them. All the coagulated

gulated blood ſhould be effectually cleared away with a ſponge and warm water; and if the patient is faint, a glaſs of wine or ſome other cordial ſhould be exhibited; by which means ſmall branches of arteries are often diſcovered which otherwiſe would eſcape notice, and which if neglected might induce much hazard and diſtreſs.

The bloodveſſels being thus ſecured, and the ſurface of the ſore cleared of blood, the divided teguments ſhould be brought together; and, in order to ſecure them with accuracy in their ſituation, ligatures ſhould be introduced at thoſe points where they are moſt likely to anſwer the purpoſe. I have ſometimes employed ſlips of adheſive plaſter inſtead of ligatures, but they do not retain the parts ſo exactly in their ſituation; and the pain which ligatures excite is too trifling to be mentioned.

In ſecuring the teguments in this manner, care muſt be taken to leave all the ligatures of the arteries hanging an inch or

or two out from the wound, ſo that they may be withdrawn in a few days; which in general may be eaſily and ſafely done when they have been applied with the tenaculum.

In order to promote the adheſion of the teguments to the parts beneath, moderate preſſure ſhould be applied over the whole by means of the napkin and ſcapulary bandage; but before applying it, the parts ſhould be all covered with a piece of ſoft lint ſpread with any emollient ointment, and over this there ſhould be a thick compreſs either of lint, tow, or ſoft old linen.

In this manner, when no portion of the teguments has been removed, as the whole ſore will be covered with ſkin, a cure will be obtained by a proceſs which ſurgeons in general have termed "the firſt intention;" that is, without the formation of matter.

But it does not often happen that the operation is adviſed whilſt this mode of practiſing it is admiſſible. In general, before

fore a practitioner recommends amputation of a breaſt, and ſtill more frequently before a patient conſents to it, a conſiderable portion of the external teguments are ſo much diſeaſed, as to render it neceſſary to remove them along with the glandular part of the mamma; or, if the ſkin is not actually diſeaſed, it commonly adheres ſo much to the moſt prominent part of the breaſt, that it cannot be ſeparated from it. In either of theſe circumſtances, ſome portion of the ſkin muſt be removed along with the mamma; and the eaſieſt method of doing it is this: A longitudinal inciſion ſhould be made, in the manner I have adviſed, through ſuch parts of the teguments as are perfectly ſound, whilſt that portion of the ſkin that is diſeaſed, or which adheres firmly to the glandular part of the breaſt, ſhould be ſeparated from the ſound ſkin, by a circular or oblong inciſion, with which the longitudinal cut ought to communicate; and this being done, the operation is to be finiſhed by diſſecting off every part that

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is indurated, along with that portion of the ſkin which in this manner has been ſurrounded with an inciſion ſuch as I have mentioned.

In the after ſtate of the ſore, a material difference takes place between the operation that I have now deſcribed, and that in which there is no neceſſity for removing any portion of ſkin. Where none of the ſkin is removed, the divided teguments on being drawn together cover the ſore completely; an adheſion commonly takes place over the whole; and the cicatrix that enſues is inconſiderable: But when any portion of ſkin is removed, a ſore is always left, which not only renders the cure tedious in proportion to the quantity of ſkin that is taken away, but the cicatrix is neceſſarily of the ſame ſize; by which much tenderneſs and irritability is left in the ſite of the diſeaſe, which I am convinced has often ſome influence in making it return.

The ſore that remains after the operation, ſhould be treated with the mildeſt dreſſings.

dreſſings. When any hemorrhagy takes place from the ſurface of the ſore, and is not removed on the larger arteries being ſecured with ligatures, dry lint ſhould be applied for the firſt dreſſing; but for all the after-dreſſings, lint covered with any emollient ointment ſhould be preferred. Mild emollients never give pain, which dry lint is very apt to excite; and they certainly admit of a more quick formation of granulations than any dreſſings that give irritation.

I have hitherto been ſuppoſing that the diſeaſe occupies the mamma only; but the lymphatics leading from the breaſt to the armpit are alſo often indurated, and likewiſe the glands in the armpit itſelf. In ſome inſtances, too, a number of diſeaſed glands are found to run from the breaſt to the clavicle, and to ſpread in conſiderable cluſters along both the upper and under edges of that bone.

In ſuch circumſtances, the amputation of the mamma itſelf muſt be managed in the manner I have already adviſed; but

beſides

besides this, an incision should be made through the skin and cellular substance from the further extremity of every cluster of hardened glands, and made to terminate in the principal cut produced by the removal of the mamma. Thus, when the glands in the armpit are enlarged, although they might frequently be pulled out either separately or connected together, by a hook insinuated below the sound skin at the sore in the breast; yet it answers the purpose better, to lay the glands first bare by an incision in the manner I have advised, and then to dissect them cautiously out with the scalpel. In the course of the dissection, a good deal of assistance may be obtained from passing a strong ligature through the largest gland; by which the whole cluster with which it is connected may be elevated from the parts below, so as to admit of their being more easily cut out with the scalpel: And it often happens, that these indurated glands run so near to the axillary artery, as to render it highly proper to use every probable

probable means for rendering the diſſection ſafe and eaſy.

In like manner, when a cluſter of diſeaſed glands is found to extend towards the clavicle, or in any other direction, after the teguments have been freely divided, the glands themſelves ſhould be totally removed; and both here and in ſimilar affections in the armpit, the divided teguments ſhould be brought together, and retained in their ſituation, either by means of compreſſion alone, or, when this is not ſufficient, by the introduction of one or more ſutures.

The point that I more eſpecially wiſh to inculcate reſpecting this operation is, the propriety of ſaving as much ſkin as poſſible. The neceſſity of this had rarely, if ever, occurred to our forefathers: And accordingly the common practice has been, to remove all the ſkin correſponding to the morbid parts underneath: By which much unneceſſary pain is produced; a very extenſive and ugly ſore is left; and the cure is always tedious. In-

ſtead of which, although it may not in every inſtance be practicable by the means that I have adviſed, to cover the ſore entirely with ſkin; yet, in all caſes, a conſiderable part of it may for certain receive this important advantage; by which the extent of the ſore will be much diminiſhed; a cure will be proportionally ſooner effected; and by the cicatrix being leſs extenſive, the riſk of the patient in future will probably be leſs alſo.

The propriety of ſaving as much ſkin as poſſible, not only in this operation, but in every other where an extenſive ſore is commonly left, particularly in amputating the extremities, has always appeared to me to be a matter of ſuch importance, that, from the time of my entering on the operative part of buſineſs, I have taken all opportunities of putting it in practice. Ever ſince the year 1772, I have managed cancerous breaſts in the manner I have now mentioned, that is, by endeavouring to ſave as much ſkin as poſſible; and the advantages

advantages derived from it have been very confiderable.

Till of late, the only means put in practice for fecuring the fkin in its fituation, fo as to effect an adhefion between it and the parts underneath, was compreffion by the napkin and fcapulary bandage, excepting in a few cafes in which adhefive plafters were employed. But as ligatures give very little pain, and as they retain the parts more certainly in their fituation, I now employ two, three, or more, according to the extent of the divided parts; and they always anfwer the purpofe.

CHAPTER XXI.

Of the PARACENTESIS *of the* THORAX.

SECTION I.

General Remarks on this Operation.

THE operation of the Paracentesis, or Tapping the Thorax, is always indicated where the action of the heart or lungs is much impeded by fluids collected in the cavity of the chest.

Hitherto this operation has been supposed to be applicable to the evacuation of water or of pus only; chiefly of the latter, in the disease termed Empyema. But I am

am clearly of opinion, that it is equally proper for the discharge of any other fluid as for collections of water or purulent matter.—The symptoms induced by collections of different fluids, may vary according to the nature of the disease, or of the accident giving rise to their formation. But it is their effect on the motion of the heart and lungs, to which practitioners ought chiefly to attend; and this will always depend more on the quantity than on the kind of fluid that is collected.

The different kinds of fluids met with in the thorax, and requiring to be drawn off by this operation, are serum, blood, pus, and air.—Of these I shall treat in separate sections.

SECTION II.

Of Serum collected in the Thorax.

Collections of serum in the chest are frequently combined with dropsy in other parts: But we often meet with it as a local affection; and it is in this case chiefly, that any advantage is to be expected from a chirurgical operation.

Independent of general effusions into the two large cavities of the thorax, dropsical collections are also met with in the pericardium, and in some instances they are confined to the mediastinum immediately below the sternum.

Various and distressful symptoms accompany these collections, but it requires much attention to ascertain their existence, and especially their particular situation, with such precision as can warrant an operation of such importance as the paracentesis of the chest.

A patient who complains of a ſenſe of weight or oppreſſion in the thorax; of difficult reſpiration; of more uneaſy ſenſations in one ſide of the cheſt than in the other; of being liable to ſudden fits of ſtarting during ſleep, from fear of immediate ſuffocation; and if, along with theſe, he is diſtreſſed with a frequent cough; if the pulſe is ſmall and irregular; and if a dry ſkin, ſcarcity of urine, ſwelled limbs, and other ſymptoms of dropſy take place, little doubt can remain of water being collected in ſome part of the cheſt. A ſenſe of undulation, as of water paſſing from one part of the breaſt to another, is ſometimes obſerved by the patient on riſing ſuddenly from a horizontal poſture; and this, I may remark, ſerves not only to aſſiſt in aſcertaining the real nature of the diſeaſe, but to determine in what particular part of the cheſt the water is collected. Much attention, therefore, ſhould be given to this circumſtance; for by means of it we may commonly determine, with ſome pre-

cision where a perforation ought to be made.

That every possible advantage may be derived from this circumstance, the patient should have his chest uncovered while under examination. When the quantity of collected serum is considerable, it may commonly be discovered by placing one hand upon the anterior part of the ribs near to the sternum, and striking with some force near to the backbone with the other; and if an indulation is perceived in one side of the chest and not in the other, the seat of the disease is thereby obvious. But when the quantity of fluid is not great, this trial is not to be trusted. In this case, a person standing behind the patient upon a chair, should be directed to take a firm hold of the upper part of his body, and to swing it repeatedly by sudden jerks from one side to another; and if water is contained in the chest, it will thus be very certainly found to undulate, and an evident noise will arise from it. I have met with different

different inſtances of this, in which the exiſtence of the diſeaſe was thus preciſely determined.

In long-continued collections of ſerum, aſſiſtance in the diagnoſis is ſometimes obtained, from the part in which the water is ſeated being more prominent than the reſt of the cheſt. It has even been alleged, that all the ribs of one ſide of the thorax have, in ſome inſtances, been found obviouſly elated, by the water being in ſuch quantities as to prevent them from contracting in the act of exſpiration. This can only happen in the very late ſtages of the diſeaſe; but wherever it takes place, it ſhews with certainty where the water is to be looked for.

When the diſeaſe is in the pericardium, nearly the ſame ſymptoms take place with thoſe which dropſy produces in other parts of the cheſt. The moſt accurate obſervation indeed will ſometimes fail in judging of this; but in the hydrops pericardii, it is obſerved, that the patient complains chiefly of the middle and left

ſide

ſide of the thorax: And Senac, in his excellent Treatiſe on the Structure of the Heart, mentions as a characteriſtic mark of this diſeaſe, a firm undulatory motion being perceived between the third, fourth, and fifth ribs on every pulſation of the heart.

As it is not in any reſpect neceſſary to enter minutely into the inveſtigation of the cauſes of theſe collections, all that I ſhall ſay reſpecting it is, that whatever tends to produce dropſy in other parts of the body, will have a ſimilar effect in forming it here.

The exiſtence of water in the thorax being aſcertained, and the part in which it is collected being diſcovered, if the medicines employed in the cure ſhall fail, and if it is evident that the patient muſt die if the operation is delayed, it ought certainly to be adviſed without farther delay: Perforating the thorax is no doubt an important operation, and it ought not to be adviſed but in real danger. I do not however heſitate to ſay, that it ſhould be performed in every inſtance where the at-

tending ſymptoms are hazardous, and cannot be removed by other means; and the method of doing it is this:

The patient ſhould be laid in a horizontal poſture, with the ſide in which the perforation is to be made laid over the bed: When in this ſituation, the ſkin over the whole ſide on which the opening is to be made, ſhould be pulled upwards by an aſſiſtant, by whom it ſhould be preſerved in this ſituation during the operation; and the ſurgeon ſhould now, with a ſcalpel, make an inciſion two inches in length between the ſixth and ſeventh ribs, in the very direction of theſe bones, and at an equal diſtance between the ſternum and backbone, taking care to avoid the under border of the ſuperior rib on account of the bloodveſſels running in its groove. But although it is neceſſary, in order to obtain ſufficient room for the ſcalpel, to have the opening in the ſkin and cellular ſubſtance of this length, there is no reaſon for continuing it of the ſame extent

to

to the bottom; ſo that, as the knife paſſes through the intercoſtal muſcles, the inciſion may in a gradual manner be ſhortened to the length of an inch. On the pleura being laid bare, it ſhould be ſlowly and cautiouſly divided, in order to avoid all riſk of wounding the lungs, leſt they ſhould at this place happen to adhere. If they do not adhere, the water will ruſh out with much force as ſoon as an opening is made in the pleura; but if the pleura adheres to the lungs at this place, the inciſion muſt either be carried forward to an inch or two nearer the ſternum, or another opening will be required, either an inch or two higher or lower in the thorax. As ſoon as water is found to flow, the ſilver canula, Plate LVIII. fig. 6. ſhould be introduced at the opening; by which means the diſcharge will not only be more eaſily completed, but will likewiſe be more readily ſtopped, if this ſhould be found neceſſary, by the patient becoming faint. By doing it in this manner, air is prevented from finding acceſs to the cavity of the

the cheſt; a circumſtance of ſome importance in this operation.

When the water collected is not in great quantity, it may commonly be all drawn off at once; but as from the ſtructure of the thorax, we are deprived, during this operation, of the advantage of compreſſion, except of that which may be communicated through the abdomen, which muſt here be very limited, when much water is collected, partial evacuations ought to be made, at longer or ſhorter intervals according to circumſtances. For this purpoſe, and with a view to give a temporary ſuſpenſion to the diſcharge, the canula ſhould be ſecured by a ribbon connected with it tied round the body of the patient, and ſtopped from time to time with a piece of cork adapted to its opening. A pledget of emollient ointment ſhould be laid over the wound; and the whole being ſecured with the napkin and ſcapulary bandage, the patient ſhould in this ſtate be laid to reſt. After a ſuitable delay of a day or

two,

two, an additional quantity of water may be drawn off; and by thus taking it away in a gradual manner, all risk may be avoided of the patient being injured by the discharge being too sudden.

In this manner any quantity of water contained in the chest may be drawn off with safety; and the patient being now relieved from the great distress under which he laboured, the canula may be withdrawn, proper means being at the same time employed for preventing a relapse of the disease.

I have hitherto supposed, that the serum is collected in only one of the cavities of the chest; but when both sides are affected, it cannot be all drawn off by one operation. In this case, therefore, after being drawn off from one side, the operation should be repeated in the other; but some risk might occur from performing it in both sides at nearly the same time, by the external air getting access at once to both cavities of the chest: For although I have advised the opening in the pleura

pleura to be ſmall, and a canula to be immediately paſſed into it, yet ſtill it is impoſſible, even with the utmoſt caution, to prevent the air from finding acceſs, either by the wound or canula, to the ſurface of the lungs; and if both cavities of the cheſt ſhould at the ſame time be filled with air, nearly the ſome oppreſſed ſtate of reſpiration would take place as was produced by the ſerum newly diſcharged. Before the operation, therefore, is repeated on the oppoſite ſide, ſome means ſhould be adviſed for expelling the air received into the cavity of the cheſt by the firſt perforation. This may be done in different ways; the moſt eaſy and convenient of which is this: Immediately after the canula is withdrawn, let the patient endeavour, as far as he dare ſafely venture, to fill the lungs with air. This will expel a conſiderable part of what was collected between the pleura and lungs, by the perforation; and if the ſkin, which was retracted before the operation, be inſtantly drawn over the ſore, and preſſed down

by

by an aſſiſtant during inſpiration, all acceſs will thus be prevented to the external air; and by this being frequently repeated, almoſt all the air collected between the pleura and lungs will be expelled: After which the ſkin muſt be drawn over the wound; and by means of a compreſs and bandage properly applied, the parts may be made to adhere without further trouble.

Air may alſo be drawn off from the thorax in the following manner: Let an exhauſting ſyringe be fitted with ſuch a mouth of ivory or metal as will allow it to be cloſely applied over the opening in the pleura. When thus applied, every ſtroke of the piſton will extract a conſiderable quantity of air; and as ſoon as the whole is ſuppoſed to be nearly exhauſted, the inſtrument may be removed, and the wound treated as I have already adviſed, by drawing the ſkin over it, and endeavouring to heal it by the firſt intention.

Or, inſtead of an exhauſting ſyringe, one of the elaſtic vegetable bottles, fitted

ted with the ſame kind of mouth, may be employed. By expelling all the air out of the bottle, and applying the mouth of it over the wound in the pleura, a quantity of air nearly equal to the bulk of the inſtrument will be extracted, and it may again be applied as often as is neceſſary; care being taken at each removal of the inſtrument to exclude all acceſs to the air, by drawing the retracted ſkin over the wound.

Air collected in either of the cavities of the cheſt, may not only prove hurtful by impeding the motion of the lungs, but it muſt likewiſe do harm by that tendency to inflame, that is commonly given to parts naturally ſecluded from the air, from their being by accident laid open ſo as to admit of air being freely applied to them. In all ſuch caſes, therefore, this circumſtance merits particular attention. When one ſide only of the thorax is laid open, either in collections of water or matter, the oppreſſion produced upon the lungs by the admiſſion of air, is not commonly of much importance, as for the moſt part

it is expelled by exſpiration alone. This I know from experience is the caſe; but inflammation, as I have already obſerved, being ſometimes induced by air finding acceſs to theſe cavities, it ought at all times to be rigidly guarded againſt; and, as much diſtreſs has been induced from both cavities of the cheſt being laid open at once, it ought never to be attempted.

Our views in what I have ventured to adviſe in the different ſteps of the operation, will appear, I hope, ſufficiently obvious; but as ſome ſurgeons prefer a different part of the cheſt, as well as a different inſtrument, for performing the operation, I think it neceſſary to conſider theſe points ſomewhat more minutely.

It has been ſaid, that unleſs the opening is lower in the cheſt, the water will not be completely diſcharged, as all that part of the cavity that lies below the wound will ſtill continue to be filled with it. But, if the patient is laid in a horizontal poſture, with his body inclined to the ſide in which the perforation is made,

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the ſpot that I have adviſed will be found to be more depending than any other; and in this ſituation we have this material advantage, that the lungs do not ſo readily adhere to the pleura, as they do farther down, where they come more cloſely into contact with the diaphragm; and here too, the perforation is made with more eaſe than it can poſſibly be nearer the ſpine, where the thick muſcles of theſe parts cannot be avoided.

With reſpect to the inſtrument with which the operation is performed, the ſcalpel, I think, is the beſt. A trocar has been recommended by many: But however well adapted a trocar is for piercing the abdomen or ſcrotum, in which none of the contained parts can be hurt if the operation is rightly performed, yet in the thorax much riſk muſt attend the uſe of it from the adheſions which often take place between the lungs and pleura, and from our not being previouſly able to determine whether they adhere or not at the very point in which the perforation is made.—

In the event of no adheſion being met with, the trocar would no doubt accompliſh the intention of the operation, and with perfect ſafety if cautiouſly introduced. But if it ſhould unfortunately be inſerted where adheſions between the lungs and pleura take place, the lungs would not only be injured, but the operation would not anſwer the purpoſe; for the inſtrument entering the ſubſtance of the lungs, it would not come into contact with the water collected between the lungs and pleura lining the ribs, and conſequently no diſcharge would enſue. With the ſcalpel, this inconvenience is avoided: On the pleura being laid bare, a ſmall hole ſhould be ſcratched in it with the point of the ſcalpel; and as ſoon as this membrane appears to be penetrated, if no ſerum is diſcharged, there will be much cauſe to imagine that the lungs adhere at this place; and the ſurgeon will now either deſiſt entirely, and make an attempt in another ſituation; or if the adheſion between the lungs and pleura is ſlight, which may be

known

known by the cautious introduction of a blunt-edged probe, as much of them may possibly be separated as to allow the canula to pass into the collection of serum: At least this trial may at all times be proposed. If the lungs are easily separated, and if the adhesion is not extensive, the operation will thus be completed; while if the contrary shall ever be the case, the operator will at least have the satisfaction to think that he has done no mischief, which he might not in such circumstances have been able to avoid, if a trocar had been used. After duly attending, therefore, to every circumstance, I am clearly of opinion, that the scalpel should in this operation be preferred to the trocar.

When the disease is seated in the pericardium, it is in some instances so much distended, that on examination, it is easily distinguished. Upon making an opening in the left side, between any two of the ribs from the third or fourth to the seventh or eighth, and within the distance

of five or ſix inches of the ſternum, we can never fail in this diſtended ſtate to meet with it; and when brought fully in view, by the pleura being freely divided for the ſpace of an inch or two, the beſt method of finiſhing the operation, is to puſh a ſmall trocar into the pericardium. If the quantity collected is ſmall, it may all be drawn off at once; but when conſiderable, the diſcharge ſhould be frequently ſtopt for a few minutes together, with a view to prevent thoſe inconveniencies which might enſue from giving a ſudden and free flow to the whole quantity.

When, again, ſerum is collected in a cyſt between the lamellæ of the mediaſtinum, as it is ſituated immediately below the ſternum, any pain or oppreſſion which it excites, is more confined to the centre of the breaſt, than we find it to be when the collection is ſeated in either of the cavities of the cheſt; and for the ſame reaſon, any opening intended to diſcharge it, muſt be made directly through the ſternum itſelf, by a piece of that bone being

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taken out with the head of a trepan, ſo as to admit of the ſeat of the diſeaſe being laid in view. The method of applying the trepan I need not enter upon at preſent, as the operation has been already deſcribed in a preceding Chapter. All that I need farther ſay upon the ſubject is, that as ſoon as the cyſt containing the fluid is laid bare, a perforation ſhould be made into it with a trocar; care being taken to manage the diſcharge in the ſame cautious manner I have already adviſed, and not to allow the parts newly laid open to be more expoſed to the air than is neceſſary.

SECTION III.

Of Blood collected in the Thorax.

WHEN blood is collected in large quantities in any part of the cheſt, the breathing becomes oppreſſed, and the motion of the heart and arteries feeble and irregular. Theſe, indeed, are ſymptoms which occur in every collection ſeated in the thorax; but they arrive at a greater and more diſtreſsful height from blood, than from collections of other fluids. In other circumſtances, the ſymptoms ariſing from blood and ſerum are ſo ſimilar, that they need not again be enumerated.

Blood may be effuſed in the cavity of the thorax by different cauſes, and of theſe the following are the moſt frequent.

1. Wounds that penetrate any of the bloodveſſels in the thorax.

2. The ſpiculæ of a fractured rib, and ſplinters of the ſternum and vertebræ, ſometimes injure the bloodveſſels in the thorax.

3. Theſe veſſels are ſometimes eroded by the matter of an ulcer or of an abſceſs; and,

4. They may be ruptured by any violent exertion, particularly in the action of coughing.

As it commonly happens, where blood is collected in the cheſt, that the veſſels from whence it is diſcharged are ſeated in the ſubſtance of the lungs, part of the blood is uſually brought up by the mouth in a fit of coughing; and when the quantity diſcharged in this manner is conſiderable, it gives relief to the oppreſſed ſtate of the lungs as well as of the heart; but whenever the action of either of theſe organs becomes much impeded by a great accumulation of blood, ſome attempt ſhould be made to draw it off by a perforation: And as blood, when extravaſated, coagulates quickly, and cannot in this

ſtate

ſtate be eaſily diſcharged, an opening ſhould be made for this purpoſe as ſoon as from the ſymptoms there is cauſe to imagine that it is beginning to ſtagnate.

When the blood is found to be ſo firmly coagulated as not to paſs off by a perforation, it has been propoſed to diſſolve or to dilute it by injecting warm water or emollient infuſions. This, however, is a practice that ought ſeldom to be adviſed; for injections, even of the mildeſt kind, muſt in this ſituation be always attended with riſk; but when it ſo happens, that much blood is collected in a coagulated ſtate, and that it cannot be drawn off even by enlarging the opening in the pleura as far as can with propriety be done; and as much hazard would be incurred by allowing it to remain, even a doubtful remedy in ſuch circumſtances becomes eligible.—In this ſituation, by frequently and cautiouſly injecting tepid water, the coagulated blood may be gradually ſo much ſoftened and diſſolved as to be at laſt diſcharged. But when

when we have it in our power to make a choice, it will be much for the intereſt of our patient, to prevent the neceſſity of this remedy, which for the moſt part may be done by making an inciſion in the manner I have adviſed, in that part of the thorax where the blood appears to be collected.—By ſome practitioners, particularly by Mr Sharpe, we are adviſed, in caſes of blood collected in the cheſt, rather to truſt to its being abſorbed or coughed up from the lungs, than to endeavour to draw it off by this operation *.—Where blood is either extravaſated in the ſubſtance of the lungs, and is freely ſpit up, or when collected in any of the cavities of the cheſt, and in ſuch ſmall quantities as to produce no material impediment to the action of the lungs or heart, it would no doubt be improper to adviſe it to be diſcharged by an operation, as in courſe of time, by blood-lettings being frequently repeated according to the ſtrength of the patient;

* Treatiſe of the Operations of Surgery, chap. xxiv.

patient; by the effect of a low diet, and other remedies usual in such cases, there will be cause to hope that it may be absorbed; and in the mean time, while the quantity of extravasated blood is inconsiderable, no material inconvenience can arise from it. But what I wish to inculcate is, that when such a quantity of blood is collected in either of the cavities of the thorax, as to disturb the functions of the organs contained in it, it ought to be drawn off by a perforation. It is said by Mr Sharpe, that, by allowing the blood to coagulate in the chest, the orifice from whence it is poured will be more readily stopt, than if it were quickly discharged. But in answer to this, I must remark, that if the wounded vessel is not large, little or no additional risk will be incurred by drawing off the blood as it is poured out, as in this case the hemorrhagy will probably stop on the patient's becoming faint: And on the contrary, if the divided vessel is large, the remedy proposed by Mr Sharpe will not be sufficient for the

the purpose; for a wound in any of the large vessels of the breast, will probably prove fatal, whether the operation of the paracentesis is performed or not.

The directions that I have given for discharging serum collected in the thorax, will, in general, prove equally applicable for the evacuation of blood: only, when the collection is produced by a ruptured bloodvessel, induced either by a fractured bone, or by some extraneous body pressed into it, the incision should be made as contiguous as possible to the part affected, so that the opening may serve not only for discharging the blood, but for extracting such portions of bone as are found to be detached, or any foreign bodies that may be met with. And again, when a wound with a sharp-pointed instrument is the cause of the collection, instead of perforating any other part of the chest, it will commonly answer the purpose better, merely to enlarge the wound; at least, this will always be preferable, in wounds of the inferior part of the thorax; but when

when ſeated ſo high in the cheſt, as to be unfit for diſcharging the blood contained in it, the operation in that caſe ſhould be performed between the ſeventh and eighth ribs, in the manner I have already adviſed.

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SECTION IV.

Of an Empyema, or a Collection of Purulent Matter in the Thorax.

THE marks of oppreſſion on the heart and lungs produced by purulent matter collected in the cheſt, are very ſimilar to thoſe which proceed from ſerum, but in collections of pus, ſymptoms take place which direct our opinion, not only in regard to the nature of the diſeaſe, but in pointing out the ſpot in which it is ſeated.

It has been aſſerted, that pus is ſometimes depoſited in particular parts without any previous inflammation. But this is ſo very uncommon, that we may lay it down as a fixed principle, that inflammation is a neceſſary forerunner of purulency; ſo that an empyema can never be met with, but as a conſequence of an inflamed ſtate of a particular part. When, therefore,

fore, ſuch ſymptoms take place, as indicate the exiſtence of a fluid in the thorax, if they have not been preceded by inflammation, we conclude that they are not induced by purulent matter. But when a patient who has for ſome time complained of a fixed pain in ſome part of his cheſt, attended with heat, a quick pulſe, and other ſymptoms of inflammation, is at laſt ſeized with oppreſſed reſpiration; an inclination to ſit in an erect poſture; with a total inability of lying on the ſound ſide; a conſtant tickling cough; frequent rigors or ſhiverings; and eſpecially if theſe ſymptoms are accompanied with an enlargement of the affected ſide, or with a ſoft œdematous fulneſs of the part in which the pain was at firſt ſeated; we may conclude with much certainty, that a large collection of matter is formed.

Inflammation of ſome portion of the lungs, or of their coverings, may be induced by various cauſes. In ſome inſtances, families appear to have an hereditary tendency to tubercles in the lungs, which

which every ſlight attack of cold is apt to affect with inflammation. A natural contracted ſtate of the thorax ſeems likewiſe to prediſpoſe theſe parts to inflame; and inflammation may be produced here, in the ſame manner as in other parts of the body, by every variety of external violence.

But by whatever means the contents of the cheſt may have become inflamed, when this terminates in ſuppuration, if the matter, inſtead of being freely diſcharged by the mouth, as is frequently the caſe, is found to produce all the ſymptoms that I have already had occaſion to enumerate of oppreſſed reſpiration, the only remedy upon which any dependence can be placed, is a perforation.

Practitioners have in general conſidered this operation as more hazardous than it really is; and it has been ſaid, that it ought never to be adviſed, but when the ſeat of the abſceſs is clearly pointed out by an external ſwelling between two of the ribs. When the lungs become infla-

med in a part that adheres to the pleura, abſceſſes may form there; and when diſcovered, they ſhould no doubt be laid open. But although the operation for the empyema, as it is commonly termed, is of ſome importance, and ſhould never be employed but when indicated by neceſſity; yet I am not of opinion that it can ever be attended with ſo much riſk as to render the formation of an external abſceſs the only cauſe for performing it. When there is reaſon to think, that previous inflammation in ſome part of the breaſt, with evident marks of its having terminated in ſuppuration, is the cauſe of oppreſſed breathing, and when the ſymptoms are not ſpeedily relieved by a free expectoration of matter, the operation of the paracenteſis ſhould be performed immediately on that ſpot where the collection is ſuppoſed to be ſeated, whether any external marks of an abſceſs exiſt or not. It may frequently happen, that no matter will be diſcharged on the perforation being made into the cheſt, for we know from experience,

that

that abſceſſes are often ſeated in the ſubſtance of the lungs, and not in either of the cavities of the cheſt. But, even in ſuch inſtances, the perforation may prove uſeful, as the lungs, by loſing their uſual ſupport at a particular point, will more readily yield than they otherwiſe would do to the matter collected in them: while, if the matter is already poured into the cavity of the cheſt, a perforation being made into it, is the only remedy that can ſave the patient. I am therefore clearly of opinion, that, in all ſuch caſes, the paracenteſis of the thorax ſhould be adviſed.

The directions given in the two preceding ſections, for conducting the perforation, will apply with equal propriety in collections of pus: Only, it muſt be remarked, when the ſeat of an abſceſs is pointed out, either by a long continuance of pain in any one point, or by matter being diſtinguiſhed between two of the ribs, that this is by much the beſt direction for the place of the inciſion. But when no ſuch mark is met with, the place

that I have advifed for the operation when water or blood is to be difcharged, will anfwer equally well for the difcharge of matter.

It is likewife neceffary to obferve, that, in purulent collections proceeding from external injuries, particularly from penetrating wounds, no operation can be neceffary, if the wound by which the abfcefs is produced is fo fituated as to difcharge the matter; but when the wound is found to be too high in the thorax for anfwering this purpofe, an opening in a more depending place becomes neceffary; and again, when the matter is feated fo immediately below the fternum that it cannot be difcharged by an opening between two of the ribs, a piece of that bone muft be removed with the trepan, as I have already advifed, when fpeaking of collections of ferum.

In abfceffes of thefe parts, the matter is commonly firft formed in the fubftance of the lungs, and afterwards difcharged into one or other of the cavities of the cheft.

It

It ſometimes happens, however, that large quantities of pus form between the pleura and ſurface of the lungs, without any apparent affection of that organ; and ſeem to proceed from an inflamed ſtate of the ſurface of the pleura. Theſe collections, however, ſeldom continue long without producing ulceration; and when ulceration has taken place, the diſcharge of matter that ſucceeds to the operation of the paracenteſis generally continues for a great length of time.

Different cauſes concur to render the cure of abſceſſes in the cavity of the cheſt tedious: The conſtant motion of the lungs; our not daring to induce that degree of inflammation that we know to act powerfully in producing a reunion of parts that have been divided by the formation of matter; and the effect of compreſſion being precluded by the intervention of the ribs. Although, in a few inſtances, the quantity of matter gradually becomes leſs, and the external opening contracts and heals, yet, from the cauſes I have men-

tioned, in a great proportion of thoſe who have undergone the operation for the empyema, or who have had large collections of matter in the breaſt, as the effect of accidental wounds, the diſcharge continues for a great length of time, moſt frequently for life. The ſore, indeed, will often heal, if it be not artificially kept open; but the matter almoſt conſtantly burſts out again, or another operation becomes neceſſary to diſcharge it, when it collects again in ſuch quantities as to produce a renewal of the ſymptoms of oppreſſion on the lungs and heart.

I have already had occaſion to advert to this ſubject when treating of wounds of the thorax, in Chapter III. Section XI. At preſent, I only think it neceſſary to obſerve, that although, in the treatment of wounds, the general uſe of tents, whether ſolid or hollow, has been condemned with much propriety; yet that we are evidently miſled by faſhion, when we lay them entirely aſide in wounds that penetrate the breaſt. I know that it is the opinion of

of many practitioners, that tents of every kind ſhould be exploded; but I alſo know, that patients who might otherwiſe have been ſaved, have frequently ſuffered by this rule being too generally followed. As long as the matter of an abſceſs in the thorax continues to find an eaſy vent, and is diſcharged freely, either by the wound by which it was produced, when this is ſufficient for the purpoſe, or by a perforation made for drawing it off, when this is found to be neceſſary, there can be no cauſe for employing tents; and in ſuch circumſtances, indeed, it would be improper to uſe them. But when the opening in the thorax heals too quickly; when, in conſequence of this, the matter does not find a free vent, and ſymptoms of oppreſſed breathing ſupervene; in ſuch circumſtances, the propriety of preſerving a paſſage for the matter is obvious. Repeated experience has convinced me, that this may be done both with eaſe and ſafety, by introducing a ſhort tube of gold, ſilver, or lead, into the opening, and allowing it

to remain for a few hours, as often as a tendency to heal makes it neceſſary. By neglecting this, and allowing ſuch ſores to heal, as now commonly happens, much miſchief is done, which, with this kind of attention, might be eaſily prevented.

SECTION V.

Of Air extravasated in the Thorax.

AIR collected in either of the cavities of the chest, excites the same symptoms of oppression on the lungs and heart, as those arising from water, blood, or matter; it therefore becomes equally an object of chirurgical management.

Collections of air may be produced in the thorax by different causes.

1. As the process of putrefaction tends to extricate air from every part of the body in which it takes place, air may be collected in the thorax, from any of the organs contained in it being seized with mortification. This variety of the disease, however, will seldom fall under the care of the surgeon; for the cause by which

it is produced can ſcarcely be ſuppoſed to yield to any remedies that may be employed for it; and unleſs the mortification is removed, no benefit could reſult from any operation.

2. Air may paſs into one or both of the cavities of the cheſt, from a rupture of the inveſting membrane of the lungs, and this again may occur from violent exertion in coughing, laughing, and crying, as well as from other cauſes.

3. The ſurface of the lungs may be eroded by ulceration, or by purulent matter in contact with them becoming acrid, by which a paſſage may be given for air into one or other of theſe cavities.

4. Wounds penetrating the lungs have ſometimes produced collections of air in the cheſt; but in ſuch inſtances, the wound muſt be made with a ſmall-pointed inſtrument puſhed in an oblique direction. A wound produced by an inſtrument carried forward in a direct line into the lungs, does not readily produce collections of air, as the air that eſcapes from

from the lungs paſſes out at the wound: But in oblique wounds, the air does not eaſily eſcape, as the parts naturally fall together; in which ſtate they operate in the ſame manner as a valve, ſo that the extravaſated air muſt neceſſarily collect in one or other of the cavities.

5. The point of a fractured rib wounding the lungs, is apt to induce collections of air in the thorax; and a fracture of the ſternum, or of any of the vertebræ, may be attended with the ſame effect.

Theſe ſeveral cauſes may occaſionally produce extravaſated air in the thorax; but we meet with it more frequently from fractures of the ribs than from any of the others.

The ſymptoms produced by air effuſed in the thorax, differ only from thoſe that occur from ſerum and purulent matter, in their arriving more quickly to an alarming height: Inſtances have occurred of death being induced in the ſpace of a few hours from the fracture of a rib, merely by air collecting in large quantities

tities between the pleura and lungs: In ſome, perhaps in the greateſt proportion of all that occur, along with this collection of air in the cheſt, the cellular ſubſtance of the breaſt becomes inflated; and if means are not ſoon employed to prevent it, the air inſinuates through every part of the body.

It is truly aſtoniſhing to obſerve, how quickly a fractured rib, when it wounds the ſurface of the lungs, will in ſome inſtances induce the moſt alarming ſymptoms.—The patient at firſt complains of tightneſs in the breaſt, attended with oppreſſion in breathing, along with pain in the parts chiefly affected.—This difficult reſpiration becomes more diſtreſsful.—The patient cannot breathe in a recumbent poſture, and is always eaſieſt when erect and leaning ſomewhat forward:—The face becomes fluſhed and ſwelled:—The pulſe is commonly feeble, and at laſt it becomes irregular:—The extremities become cold; and if relief is not quickly obtained,

obtained, the patient is at laſt carried off with every mark of ſuffocation.

The emphyſematous ſwelling of the external parts of the cheſt, which ſometimes takes place here, is eaſily diſtinguiſhed from watery effuſions, by the crackling produced on preſſure; the ſenſation it communicates being nearly ſuch as is received from preſſure upon a dry bladder when nearly filled with air. For the removal of this ſymptom, ſcarifications have been employed. By making ſeveral inciſions, each about half an inch in length, along the courſe of the ſwelling, a good deal of air may be diſcharged, eſpecially if the air contained in the ſwelling is frequently preſſed towards theſe openings. A conſiderable quantity, too, of the air collected in the thorax, will be drawn off by the ſame means: For, as ſoon as any part of it paſſes off from the cellular membrane, its place will be immediately ſupplied from the cheſt; and if the quantity that eſcapes by the wound in the lungs, is not greater than the quantity diſcharged

charged by the ſcarifications, the whole in this manner may ſoon be removed. But it frequently happens, that the air forced out from the lungs is much more than can paſs off by any number of ſcarifications that can be made; in which caſe, any relief that takes place in the oppreſſed ſtate of reſpiration, is commonly inconſiderable.

Till of late, patients in this ſituation almoſt conſtantly died; for when ſcarifications failed in diſcharging the air, and even this remedy has not been long in uſe, practitioners were not acquainted with any other means of relief.—But we now know, that in all ſuch caſes, where the oppreſſed ſtate of breathing is great, and the ſymptoms are evidently induced by air collected in the cheſt, that the ſame remedy ſhould be employed for removing it, as is found to ſucceed in collections of any other fluid, *viz.* the operation of the paracenteſis; and it has accordingly, of late years, been frequently performed, and always with complete ſucceſs; the tenſion

tension in the breast, difficulty of breathing, and every other symptom being immediately relieved on a perforation being made through the pleura *.

With a view to prevent the inconveniencies that result from the external air finding access to the cavities of the chest, it has been proposed to make the opening with a trocar instead of a scalpel; and by entering the instrument in an oblique direction, this purpose would no doubt be answered.

When the chest is completely filled with air, and if certainty could be obtained that no adhesions existed between the lungs and pleura, the operation might be performed with safety, and with more ease by the trocar than with any other instrument. But as we can never know with precision whether the lungs adhere or not, I am, for these and other reasons mentioned

* This operation for the evacuation of air from the chest was first proposed by Dr Monro, about the year 1760, in his lectures in this University.

mentioned in a preceding part of this chapter, induced to think that the operation may be done with more ſafety with the ſcalpel. And if the directions that I have given are obſerved, of retracting the ſkin from the part to be perforated; of introducing a canula immediately into the opening in the pleura, as ſoon as air begins to eſcape; and drawing the retracted ſkin over this perforation into the cheſt, as ſoon as the canula is withdrawn, the operation may be done with more certainty of avoiding the lungs, in the event of their adhering to the pleura, and probably with more ſucceſs in every reſpect, that when the trocar alone is employed.

The practice, therefore, that I would incline to follow, is, in the firſt place, to make ſeveral inciſions along the courſe of the ſwelling, each of a half inch in length, and of ſuch a depth, as to paſs entirely through the ſkin into the cellular membrane: And, if theſe do not afford relief, which, however, they frequently

quently do, to proceed immediately to perforate the cavity of the cheſt in the manner I have adviſed, and as near as poſſible to the injured part, when the malady has been induced by external violence, if this be not near to the backbone; in which caſe the perforation ſhould be in the moſt depending part of the thorax, as I have already adviſed in collections of water, blood, and matter. And when produced by violent exertion in coughing, crying, or laughing, the particular ſeat of the complaint will in general be diſcovered by ſome degree of pain in the injured part.

CHAPTER XXII.

Of the Paracentesis of the Abdomen.

IT is the effect of various diseases to produce collections of fluids in the cavity of the abdomen: Occasionally these collections are removed by the internal exhibition of medicines, though in a great proportion of cases, we are obliged to employ the operation of Paracentesis or Tapping.

There is naturally secreted into the cavity of the peritonæum, a serous exhalation, for the purpose of lubricating and keeping moist the surface of the intestines. Various causes may concur to produce a morbid increase of this secretion; and whenever the quantity collected in the abdomen is large, it constitutes a disease termed Ascites.

This

This variety of dropſy often accompanies a general diſeaſe of the ſyſtem, being frequently combined with anaſarca; but in ſome inſtances it is local, and is evidently induccd by compreſſion of the lymphatics; moſt frequently by ſchirrous ſwellings of ſome of the viſcera; commonly indeed by an enlarged ſtate of the liver.

The preſence of a fluid in the cavity of the abdomen, is known by the ſwelling that takes place; by a ſenſe of tightneſs all over the belly; by the breathing being difficult and laborious, when the patient is in a horizontal poſture; and by a ſenſe of fluctuation being communicated to the fingers placed on one ſide of the belly, when it is forcibly ſtruck on the other. A concurrence of theſe circumſtances will always, to a diſcerning practitioner, point out the real nature of the diſeaſe; but a further confirmation is obtained of it when the patient complains of much thirſt, a dry ſkin, ſcarcity of urine, and other ſymptoms of dropſy.

When the ſwelling is found to extend equally over the abdomen, the ſerum is commonly diffuſed among the different viſcera, and is contained within the peritonæum only. It ſometimes happens, however, that it is collected in different cyſts, or perhaps in one or both of the ovaria; in which caſe, the tumor is not commonly ſo equal, nor the fluctuation ſo diſtinctly perceived, as when the water flows freely through the whole cavity. This circumſtance of fluctuation depends alſo on the conſiſtence of the fluid; for, we ſometimes find it thick and gelatinous, whilſt moſt frequently it is thin and perfectly ſerous. In ſome inſtances, too, an innumerable quantity of ſmall hydatides are found ſwimming in the ſerum of aſcitical ſwellings, by which the fluctuation is commonly made obſcure.

Whatever may be the influence of diuretics and other evacuants in the cure of general hydropic ſwellings, they rarely prove uſeful, as I have elſewhere obſerved, in local collections. The principal object, therefore,

therefore, to be kept in view here is, to discharge the water collected in the abdomen, by a chirurgical operation, as soon as its existence is ascertained; while the most effectual remedies should in the mean time be employed for preventing a recurrence of the disease. This indeed is often impracticable: But, in some cases, cures are accomplished; and it would probably happen more frequently, if the fluid collected in the belly was more early discharged. In general, this is delayed too long; for the bowels must surely be greatly injured by being so long soaked in water, as usually happens in ascites, before the operation is advised. This, too, is the more improper, as the operation of tapping is in itself exceedingly simple. It excites little pain; and any danger attending it does not proceed so much from the nature of the operation, as from the constitution being, in general, much debilitated by the long continuance of the disease before it is performed; which renders it liable to consequences that other-

wife would not fo readily occur, and which frequently terminate fatally. I am fo perfectly convinced indeed of this, that I commonly advife the water to be drawn off as foon as a fluctuation is diftinctly perceived; and I have never been fenfible of any harm being done by it.

In large collections of fluids, whereever they are fituated, more particularly in the abdomen, the fituation of a large proportion of bloodveffels, it is found to be exceedingly hazardous to difcharge their contents fuddenly; owing, as we fuppofe, to the immediate influence produced upon the circulating fyftem, by our thus depriving it too quickly of a fupport to which it had for a long time been accuftomed.

But whatever may be the immediate caufe of the fymptoms refulting from fudden evacuations of this kind, the effect is always certain. Syncope often happens; and death itfelf fometimes enfues from it. This, in former times, made tapping a hazardous operation; and when the collection

lection was large, in order to avoid thofe inconveniencies that enfued from the water being all drawn off at once, it was done at different times, a day or two being commonly allowed to intervene between one operation and another.

This, however, proved very inconvenient and diftrefsful; and by the frequent introduction of the trocar which thus became neceffary, mortification of the wound, and other troublefome confequences, were apt to enfue.

The late Dr Mead, reflecting on the probable caufe of thofe fymptoms arifing from the fudden difcharge of large collections of water, was induced to try the effect of preffure upon the parts in which they are feated, as a fubftitute for the fupport of which they are deprived by the evacuation; and the fuccefs attending the practice has fully juftified the ideas that he entertained of it; for when preffure is properly applied, almoft any quantity of water that the abdomen can contain, may with fafety be drawn off. It ought, how-

ever, to be applied with much equality, over the whole belly; and continued without interruption for the space of several days after the operation.

Various means have been proposed for applying equal pressure in this operation; but none of them answers the purpose so easily, and with so much effect, as a bandage invented by the late Dr Monro, represented in Plate LXII. fig. 2. Two different sizes of this bandage should be always in readiness; so large as to cover the whole abdomen, and to press with equality upon every part of it.

It is not necessary to recapitulate the means used in former times, for discharging hydropic collections; for they are now very universally, and with much propriety, laid aside; the trocar being the only instrument at present employed for this purpose. This instrument, till of late, was always round, with a triangular point. As this form, however, is evidently ill calculated for an easy entrance of the instrument, an object of much importance

ance in the operation, I was led a good many years ago to the uſe of a flat trocar with a lancet point, repreſented in Plate LVIII. fig. 1. This has always anſwered the purpoſe properly; but ſome improvements have been propoſed upon it, by which it is made to enter with ſtill more eaſe. In Plate LIX. fig. 2. I have delineated a very neat invention by Mr Andrée.——It has been objected, however, to this inſtrument, and I believe with good reaſon, that the canula, by conſiſting of two ſides which fall together with ſome force on the ſtilette being withdrawn, may thus lay hold of a portion of inteſtine; and if this ſhould ever occur, much diſtreſs and even danger might enſue from it. In Plate LVIII. fig. 2. an improvement upon the trocar is given, to which no ſuch objection occurs: It enters with the ſame eaſe as a lancet; and the two ſides of the canula, by not falling cloſe together, can never injure the inteſtines.

In

In performing the operation, it has been ſaid, that the opening may be made with almoſt equal propriety in any part of the inferior boundaries of the abdomen. This, however, is not the caſe: For, in the centre of the abdomen, immediately below the umbilicus, and in the courſe of the recti-muſcles, it might fall upon the epigaſtric artery; and, if carried near to either of the oſſa ilia, the inteſtines would more readily be hurt than if made nearer the navel. The ſafeſt and beſt part for the perforation ſeems to be, at a point lying at nearly an equal diſtance between the umbilicus and centre of the ſpine of the ilium. No large bloodveſſels can probably be wounded here.—The abdominal parietes are not in this part entirely tendinous; but are ſomewhat fleſhy, ſo that they more readily heal when wounded.—None of the inteſtines can in this ſituation be readily injured; and when the patient is laid in a horizontal poſture, in which he ought always to be during the whole courſe of the operation, the point that I have

have mentioned will be found to be more depending than perhaps any other.

The operation being determined upon, the method of performing it is this: The point in which the perforation is to be made, ſhould be marked with ink; and in applying the bandage, Plate LXII., one of the openings ſhould be placed exactly oppoſite to this mark. The bandage being accordingly applied in this manner, and the ſtraps being put through the buckles, and drawn ſomewhat tight, the patient ſhould now be laid in a horizontal poſture, with his head elevated, and the ſide to be perforated lying over the ſide of the bed. The ſurgeon is now to take the trocar in his right hand; and fixing the head of the ſtilette in the palm of his hand, while his fore-finger directs the point of the inſtrument, he is now to puſh it forward till he finds that the end of the canula is entirely through the muſcles, and lodged in the cavity of the abdomen; which he may be certain is the caſe, when he finds no farther reſiſtance to the ſtilette.

lette. The ſtilette is now to be withdrawn, and the canula allowed to remain as long as the diſcharge continues, care being taken to pull the bandage gradually tighter as the water flows off; or, if the patient, notwithſtanding this precaution, ſhall become languid, a total ſtop ſhould be put to the diſcharge for a few minutes, which is eaſily done by the ſurgeon placing his finger from time to time on the mouth of the canula.

It ſometimes happens, that the diſcharge ſtops before the ſwelling is much diminiſhed: When this is owing to a portion of omentum or inteſtine ſtopping the extremity of the canula, the diſcharge is eaſily renewed by inſerting a blunt probe into it, ſo as to puſh back whatever may have plugged it up; or when the ſerum is thick and gelatinous, in order to effect a complete evacuation, it may ſometimes be neceſſary to introduce a trocar of a larger ſize than that which was firſt employed. But when it proceeds, as is ſometimes the caſe, from the ſerum being collected in

particular

particular cyſts, no attempt of this kind will have any effect: In ſuch circumſtances, the canula muſt be withdrawn, and the wound being covered in the ordinary way with a pledget of any ſimple ointment, the operation may be renewed either immediately or on the following day, on the oppoſite ſide of the abdomen; or if the ſwelling is confined to any other part of the belly, the perforation muſt be made in the moſt depending part of it, wherever that may be.

Dropſical ſwellings of the ovaria exhibit nearly the ſame appearances with encyſted dropſies of any other kind: Only, in collections of this kind in the ovaria, the fluctuation of a fluid is not commonly very diſtinct; and unleſs they are complicated with aſcites, the ſwelling is commonly confined to one ſide of the abdomen.

The propriety of drawing off the water by a perforation, is here, however, equally obvious as in any other variety of the diſeaſe: That is, when we wiſh to diminiſh or remove the tumor, it muſt neceſſarily

rily be done in this manner; but I think it right to obſerve, that, in dropſical ſwellings in the ovaria, the diſeaſe does not increaſe ſo rapidly as in common caſes of aſcites; neither does it appear to injure the conſtitution ſo much, and the water not being in contact with the inteſtines, we are not in this variety of the diſeaſe under the ſame neceſſity of adviſing the perforation early.

The ſerum being all drawn off, and the opening dreſſed in the manner I have adviſed, the bandage muſt ſtill be continued ſufficiently tight for preventing thoſe diſtreſsful feelings which the ſudden diſcharge of it would otherwiſe be ſure to induce: And there is even reaſon to think, that the ſupport which the bandage affords to the weakened parts may have ſome effect in preventing a return of the diſeaſe; but when, notwithſtanding of this, and of ſuch internal remedies as are employed, the water is again found to collect, the operation falls to be repeated whenever the ſwelling becomes large.

Aſcites

Aſcites is perhaps the moſt frequent variety of tumor to which the abdomen is liable; but in ſome inſtances, inſtead of water, tumors of the abdomen are found to contain air, conſtituting a diſeaſe termed Tympanites.

The effect produced by this upon the breathing, is nearly the ſame as what enſues from collections of water; but the ſwelling itſelf is much more tenſe than the other, and affords to the touch and preſſure nearly the ſame ſenſation as is received from a bladder filled with air.

In a great proportion of caſes of tympanites, the air after death is found in the inteſtines; which, in ſome inſtances, have been inflated to a moſt enormous ſize. This I ſuppoſe to proceed from the inteſtines loſing their tone; but there is another variety of the diſeaſe, in which the air is diffuſed in the cavity of the peritonæum, in a ſimilar manner to water in aſcites. I have ſeen one inſtance of this, and I have heard of another, which happened lately in this place; but in both, the air

was

was found to have escaped from a small hole in one of the intestines. I am therefore inclined to believe, that this variety of tympanites very commonly proceeds from communication having taken place between the alimentary canal and the cavity of the peritonæum; and therefore, that any remedies we can employ, must, where this is the case, be of no avail. But from whatever cause the disease may have arisen, and whether the air should be contained within the bowels themselves, or diffused in the cavity of the peritonæum, no doubt should be entertained of the propriety of discharging it, as soon as it appears to have brought the life of the patient into danger.

This may be easily done in the very manner I have directed for ascites; taking care to use a trocar of the smallest size, and to employ pressure in the same guarded manner as when the tumor is formed by water. For, as the air will by its pressure produce nearly the same effects upon the neighbouring parts as we find

found to arise from water, it is equally necessary to employ such a degree of compression after it is discharged as will obviate the effects of abstracting it. To perforate the abdomen for air collected in the intestines, is no doubt a very formidable operation, and ought not to be attempted but in cases of the greatest danger; but as death has often ensued from this variety of the disease, and of which I have met with different instances, I am clearly of opinion, when the remedies prescribed by the physician for removing it have failed, that the assistance of surgery should always be desired, rather than allow the patients to die in certain misery. The same remedy is frequently and successfully employed for discharging air collected in the stomach and bowels of other animals: We have much reason, therefore, to hope, that in the human species the same effects would result from it.

After the operation of tapping, whether in ascites or collections of air, we are commonly advised to rub the abdomen

from time to time with astringent spiritu-ous applications. This can never do harm: It may sometimes serve to restore the tone of the integuments, and as the friction employed in it may tend to promote ab-sorption, it ought never to be omitted. For the first two days after the operation, it cannot be employed, as during that pe-riod the bandage ought not to be remo-ved: But this being elapsed, the bandage may be removed daily for about a quarter of an hour at once, for the purpose of rub-bing the abdomen with camphorated spi-rit of wine, or volatile liniment; care be-ing taken to preserve the body during the time of it in a horizontal posture, and to renew the application of the bandage as soon as the friction is over.

CHAPTER XXIII.

Of HERNIÆ.

SECTION I.

Of Herniæ in general.

THE term Hernia might with propriety be applied to every ſwelling produced by the diſlodgement of parts from thoſe boundaries within which in a ſtate of health they are contained; but the term in its general acceptation, implies, a tumor produced by the protruſion of parts from the cavity of the abdomen.

The parts in which Herniæ uſually appear, are the groin, ſcrotum, labia pudendi, the upper and fore part of the thigh, the umbilicus, and different points between the interſtices of the abdominal muſcles.

If the ſituation of theſe tumors is various, the viſcera which they contain are ſtill more ſo. Inſtances have occurred of the ſtomach, uterus, liver, ſpleen, and bladder, being found in them. But they moſt frequently contain a portion of the omentum or alimentary canal, and in ſome inſtances a portion of both.

From the ſituation and contents of herniæ, all the appellations are derived by which this kind of tumor is diſtinguiſhed: Thus Herniæ are termed Inguinal, Scrotal, Femoral, Umbilical, and Ventral, from their appearing in the groin, ſcrotum, thigh, navel, or belly. When confined to the groin, a hernia is ſaid to be incomplete, and is termed Bubonocele; but, when the tumor reaches to the bottom of the ſcrotum, the rupture is then ſuppoſed to be complete,

complete, and the diseaſe obtains the name of Scrotal Rupture, or Oſcheocele.

When a portion of gut alone forms the tumor, it is called an Enterocele, or Inteſtinal Hernia; when a piece of omentum only has got down, it is termed Epiplocele, or Omental Hernia; and if both inteſtine and omentum are down, is is called an Entero-epiplocele, or Compound Rupture.

As all the abdominal viſcera are apparently contained within the cavity of the peritonæum, and as it was judged to be impoſſible for that membrane to admit of ſuch a degree of diſtention, as to ſurround tumors containing ſuch large portions of the viſcera as are ſometimes puſhed out, it was till of late imagined, that, at leaſt in a great proportion of caſes, the peritonæum is burſt or ruptured; and from this the term Rupture ſeems to have been adopted: The opinion was farther confirmed, from its being obſerved, that in ſcrotal hernia, the protruded viſcera were in ſome inſtances found in contact with

the teſticle; a circumſtance, which it was ſuppoſed could not happen, if the peritonæum had not been previouſly ruptured.

Since the anatomy of theſe parts however, was better underſtood, this circumſtance, of parts protruded from the abdomen being in ſome inſtances found in contact with the teſticle, is explained in a more ſatisfactory manner than on the ſuppoſition of a rupture of the peritonæum; and as the nature of herniæ will be better underſtood by an anatomical deſcription being premiſed of the parts concerned in their production, I ſhall, before proceeding farther, endeavour to deſcribe them: The parts chiefly concerned in herniæ, are, the abdominal muſcles; the peritonæum; teſticles, and ſpermatic veſſels.

The ſides and other fleſhy boundaries of the abdomen are formed by five pair of muſcles; the recti, pyramidales, tranſverſales, obliqui interni, and obliqui externi.

In ſome ſubjects, the pyramidales are wanting; and as the obliqui externi are

thoſe

these which in hernia are most connected with the disease, I shall here describe these only.

The obliqui externi are two thin, broad muscles: on their posterior and upper parts they are fleshy; and tendinous on their anterior and lower parts. They originate from the eighth, ninth, and inferior ribs, by fleshy portions which intermix in a serrated manner with corresponding parts of the latissimus dorsi, serratus major anticus, pectoralis major, and intercostales: And afterwards becoming tendinous, they form the greatest part of all the anterior surface of the abdomen, and are inserted into the linea alba, the spine of the os ilium, and the os pubis. On each side of the under part of the abdomen immediately above the pubes, two openings are met with in these tendons, intended for the passage of the spermatic vessels in men, and for the ligaments of the womb in women. These openings, or rings as they are termed, which seem to be formed merely by a separation of the fibres

fibres of the tendon from one another, are of an oval figure, and have an oblique direction from the ſpine of the ilium downwards; they are ſomewhat wider above than below, and are rather of a larger ſize in men than in women.

Although theſe rings or openings have been commonly deſcribed as paſſing through not only the external oblique, but the tranſverſales and internal oblique muſcles alſo; yet we now certainly know, that it is in the tendinous parts of the external oblique muſcle only, that any ſuch opening exiſts. It is of ſome importance to be thoroughly acquainted with this; for, by the accounts received of it from books, we are led to ſuppoſe, that, inſtead of one diſtinct paſſage, there are always three. Theſe muſcles are likewiſe perforated in the middle by the umbilicus, which affords a paſſage for the connecting veſſels between the mother and uterine fetus, and which is ſo far continued through life, that the ſpace is filled up with cellular ſubſtance only.

From

From the inferior border of the tendinous part of the external oblique muſcle, a detachment of fibres is ſent off, which, after affording a firm covering to the inguinal glands, are loſt in the faſcia lata of the thigh; and the under edge of this tendon being folded inwards, obtains the appearance of a ligament, which ſtretches from the fore-part of the os ilium to the pubes, forming a kind of arch, through which the great bloodveſſels of the lower extremity paſs to the thigh. It is this ligamentous-like portion of the external oblique muſcle, that is known by the appellation of the ligament of Poupart or Fallopius.

This paſſage for the bloodveſſels of the thigh, being larger in women than in men, owing to the greater ſize of the pelvis in the former, by which the arch formed by Poupart's ligament is rendered both longer and wider; ſo in women the crural hernia, or that variety of the diſeaſe formed by a protruſion of parts through this paſſage, is more frequent than in men.

The

The internal ſurface of the muſcles of the abdomen, together with every other part of that cavity, is lined with a ſmooth ſomewhat elaſtic membrane, termed Peritonæum. This membrane, beſides lining the cavity of the belly, furniſhes the external covering to almoſt all the viſcera contained in it; but in ſo ſingular a manner are theſe coverings produced, that although at firſt ſight the different viſcera appear all to be contained within the cavity of the peritonæum, yet on minute examination they are in reality found to lie behind it.

The peritonæum, after having completely lined the cavity of the abdomen, is continued or reflected over all the viſcera, ſo as to give an external covering to each. After ſurrounding one of the viſcera, it ſtretches along to the moſt contiguous, forming in its courſe the ſupporting membranous ligament of the liver, and other viſcera; and affording in its duplicature a kind of ſupport or connection to the various bloodveſſels, as they ſtretch along

to

to their deſtined ſituations in the inteſtinal canal and other organs.

Behind the peritonæum there is a quantity of looſe cellular ſubſtance, by authors commonly termed its Appendix. In ſome parts this ſubſtance is filled with fat; and in others it is empty, and can eaſily be filled with air.

The teſtes in the fetus, till near the period of delivery, are lodged in the cavity of the abdomen, in the ſame manner with the reſt of the abdominal viſcera. They are ſituated immediately below the kidneys, on the fore-part of the pſoæ muſcles, near to the upper end and by the ſide of the rectum, where their external covering adheres by its poſterior ſurface to thoſe parts of the peritonæum on which they reſt, while all their anterior and lateral ſurfaces lie looſe in the abdominal cavity in contact with the other viſcera. Even in this ſituation, however, a connection takes place between the teſtes and ſcrotum. This is formed by means of a ſubſtance that runs down from the under

der end of the teſtis to the ſcrotum, forming a kind of pyramidal-ſhaped ligament; its large bulbous head being fixed to the lower end of the teſtis and epididymis; and its under extremity, after having paſſed through the ring in the external oblique muſcle, being loſt in the cellular membrane of the ſcrotum. This ligament is evidently vaſcular and fibrous, and ſeems in part to be compoſed of the cremaſter muſcle turned inwards *.

All that portion of the ligament contained within the parietes of the abdomen paſſes behind the peritonæum, and receives a covering from it in the ſame manner with the teſtes and other viſcera: the peritonæum even gives a coat to a portion of the ligament after it has got into the groin, by paſſing down along with it from the abdomen into the upper part of the inguen.

At

* See a very accurate account of the Anatomy of theſe parts by Mr J. Hunter, in Dr Hunter's Medical Commentaries.

At this place, viz. at the annular opening of the external oblique muſcle, the peritonæum is very looſe; and when the ligament and ſcrotum are drawn downwards, an aperture is obſerved from the cavity of the abdomen all around the fore-part of the ligament, that ſeems ready to receive the teſtis; and this aperture gradually becomes larger as the teſtis deſcends behind the peritonæum in its way to the ſcrotum. While the teſticle is ready to deſcend, it does not fall down, as has been commonly imagined, along the fore-part of the peritonæum, between it and the other viſcera; but the ligament I have deſcribed, as lying behind the peritonæum, and connected with the teſtis at its under and poſterior parts, by directing or pulling it down as it were, from behind, brings it in this manner along the pſoas muſcle between it and the peritonæum; and that part of this membrane to which I have ſhown that the teſticle adheres, being neceſſarily drawn along with it, a kind of pouch or bag ſomewhat reſembling

resembling the finger of a glove, is thus formed by this elongation of the peritonæum; the under extremity of which still continues to surround the testis as it goes along, in the same manner as it did while the testicle rested upon the psoas muscle; and the entrance from the abdomen to the cavity of this process is exactly at that point where the testis was originally situated; for it is there that this process commences when the testis begins to descend.

The peritonæum being in a fetus remarkably lax and dilatable at this part, and being connected posteriorly, as we have seen, with a quantity of loose cellular substance, its elongation produced by the descent of the testicle is in this manner provided for by nature, and of course is easily admitted of.

It must not, however, be supposed, that the testis and peritonæum in coming down fall loosely and without connection; for, as they slide down very slowly, they still continue to adhere to the parts lying behind

hind them, as they did when in the abdomen.

The precise time at which the testis passes down from its original situation in the abdomen, cannot be ascertained; but in general, this change takes place about the eighth month. About this period, the testis, surrounded with the peritoneal process, moves downwards, till its under extremity comes in contact with the most inferior point of the abdominal parietes; and by this time the passage through the tendon of the external oblique muscle is found much enlarged, by the ligament of the testis having sunk downwards so as to dilate it.

After the testis has passed the tendon of the muscle, it commonly remains for some time by the side of the penis, and by degrees only descends to the bottom of the scrotum; and even when it has got entirely into the scrotum, its ligament is still connected with it, and lies immediately under it, but is shortened and compressed.

The

The procefs of the peritonæum, which appears to defcend with the tefticle, continues to cover it when it has reached the fcrotum: It is this loofe covering or bag, which is afterwards converted into what Anatomifts term the Tunica Vaginalis Teftis; and from the defcription which I have given of it, it is evident, that the cavity of this bag muft at firft communicate with the great peritoneal cavity of the abdomen. This it accordingly does, as a probe may be paffed readily and eafily along this procefs or bag, from the belly down to the bottom of the fcrotum; and if laid open through its whole length on the fore-part, it will be plainly feen to be a continuation of the peritonæum; the teftis and epididymis will be found at the lower part of it without their loofe coat the tunica vaginalis; and as the fpermatic veffels and vas deferens, while the tefticle remained in the abdomen, entered the body of that gland behind, and between the reflected lamina of the peritonæum, fo here, when in the fcrotum, they will be

found

found covered by the poſterior part of the bag, in their whole courſe from the commencement of that proceſs down the groin to the teſticle.

This paſſage from the cavity of the abdomen to the ſcrotum is in general very ſoon cut off, by a firm adheſion taking place between the ſides of the peritoneal proceſs at its upper extremity where it deſcends from the abdomen. What the cauſe of this adheſion may be, is uncertain; perhaps it may proceed from ſome ſlight degree of inflammation being excited upon the contiguous parts by the forcible paſſage of the teſtis; but whatever the cauſe may be, the fact is, that at the time of birth this paſſage in general is completely obliterated *.

* The deſcent of the teſtes from the abdomen is a phenomenon very difficult to account for, and its immediate cauſe may probably always remain a myſtery; but their being in almoſt every inſtance found in the ſcrotum before birth, is a clear proof of their not being forced down by the effects of reſpiration, as has been commonly ſuppoſed.

It is in the neck only, however, or in the ſuperior part of this proceſs, that this adheſion takes place: The lower extremity of the ſac remains open and looſe through life, and forms, as I have already obſerved, the tunica vaginalis teſtis, the common ſeat of a hydrocele.

If attention is given to this deſcription, it muſt appear, that if immediately upon the teſticle deſcending from the abdomen, and before the paſſage is ſufficiently contracted, any portion of the alimentary canal or omentum ſhould likewiſe fall into the opening, ſuch parts muſt for certain lodge in the ſame bag or covering with the teſtis itſelf; and as long as they remain there, that they muſt effectually prevent the uſual obliteration of the paſſage from being accompliſhed.

It is this occurrence, of a portion of ſome of the abdominal viſcera getting into the tunica vaginalis teſtis, which forms that ſpecies of hernia to which new-born infants are liable, termed Hernia Congenita. The teſticle and protruded inteſtine being

being here in contact, the tunica vaginalis testis forms the hernial sac.

If the gut, or other parts which have fallen down, are again pushed into the abdomen, and retained there by a truss, the passage soon fills up, and no return of hernia takes place. But if this is neglected, and the gut allowed to remain long down, the parts forming the passage seem thereby to lose that power of adhesion which naturally they are known to possess; instances being often met with where no art is able to produce this wished-for obliteration.

The hernia congenita is usually produced in the manner I have described: I believe, however, that it may happen, and I think I have seen instances of its doing so, from this passage between the abdomen and testicle, after having been once closed, being again rendered pervious, in consequence of the parts being over-stretched by those violent fits of coughing, crying, and other convulsive affections to which children soon after birth

are liable. The inteftinal canal and other vifcera, being pufhed with violence againft the containing parts, thefe will moft eafily give way that are the leaft firm, and this will moft probably be the cafe with thofe that have been moft recently united. In this manner, it is probable that a great proportion of thofe herniæ are produced which happen in early infancy; and I am inclined to think, that even in more advanced ftages of life, the fame variety of hernia may occur from the fame caufe.

It is evident, then, in what manner the hernia congenita is produced: We fhall now inquire into the caufes of hernia in its more ufual form.

I. The containing parts of the abdomen are elaftic and compreffible; whatever, therefore, tends by compreffion or otherwife to leffen the cavity of the abdomen, muft occafion a proportional rifk, of fome of the contained parts being pufhed from their natural fituations. The abdominal mufcles and diaphragm are excited to fevere contraction, by various caufes,

causes, particularly by violent coughing, crying, laughing, and severe bodily exertion; and as the contraction of these muscles must always lessen the abdominal cavity, these causes therefore are frequently productive of hernia.

II. Falls, in consequence of the derangement which they produce in the abdominal viscera, from the sudden and violent shock with which they are often attended, are not unfrequently the immediate causes of hernia.

III. Persons of a preternatural laxity of frame, are very liable to hernia. The containing parts of the abdomen, from the want of sufficient tone and firmness, are unable in such people to resist the weight of the different viscera: They are therefore more particularly liable to hernia on the application of any of those causes that usually give rise to it.

IV. Sprains are apt to induce a laxity of the injured part; and have therefore a similar influence in inducing hernia, with general laxity.

V. It has been obſerved, in thoſe countries where oil is much uſed as an article of food, that the people are particularly liable to herniæ. In confirmation of which I may remark, that all who have attended the hoſpitals in France, where much oil is uſed, and where hernia is one of the moſt prevailing diſeaſes, are aſtoniſhed to find that it is not frequent in the hoſpitals of London and Edinburgh: One foreigner in particular remarked to me, that in a ſingle hoſpital in Paris, the operation for ſtrangulated herniæ during his reſidence there had been performed upwards of a hundred times in one year, while in ſome of the largeſt hoſpitals of London, it was only performed twice during the ſame period, and in eight or nine months here he had only ſeen it once.

In whatever parts the parietes of the abdomen are weakeſt, theſe various cauſes will moſt readily operate in producing herniæ; and accordingly we find, that

descents of the bowels usually occur only in such parts.

The parts which from anatomy we would à priori suspect to be most liable to herniæ, are, the openings already described in the external oblique muscles; the arch formed by Poupart's ligament for the passage of the great bloodvessels of the thigh; and the umbilicus, where the same firmness does not take place as in the rest of the tendinous expansion of the abdominal muscles.

These, as I have already observed, are the usual seats of hernia; but it sometimes happens, that parts of the viscera are protruded between the interstices of the different muscles of the abdomen: This, however, is not frequent.

In whatever part a descent of any portion of intestines occurs, except in hernia congenita, as all the viscera are contained in the manner already described, within the peritonæum, a portion of that membrane, it is evident, must be carried down along with the parts that are pro-

truded; and in every ſuch inſtance, it is this portion of the peritonæum going down along with the gut that is termed the Hernial Sac. The ſize and thickneſs of this ſac is various in different ſubjects, and in different ſtages of the ſame diſeaſe.

On the firſt appearance of hernia, the ſac is commonly ſmall, for the protruſion ſeldom becomes large at once; but by repeated deſcents of the bowels, the ſac is puſhed lower and lower, till in ſome inſtances its bulk is very conſiderable indeed; and when in this advanced period of hernia the ſac is laid open, it is found to contain either large quantities of omentum or inteſtine, and frequently large portions of both.

As the peritonæum has this property in common with other parts of the body, of thickening according to the degree of gradual extenſion applied to it, ſo the thickneſs and firmneſs of the hernial ſac is often ſurpriſingly great, a circumſtance which

which every operator ſhould keep in view.

Although every inſtance of any portion of inteſtine protruded from its natural ſituation, is to be conſidered as a derangement, and as ſuch demands our attention, yet daily inſtances occur, both of recent herniæ, and of thoſe of longer duration, from which no bad ſymptoms enſue. Thus we often meet with large hernial ſwellings, without the patient ſuffering in any other manner, than from the inconvenience ariſing from the bulk of the tumor. In general, however, it is otherwiſe; and troubleſome ſymptoms moſt frequently take place; but whether they do or not, when the reduction of a hernia can be accompliſhed, it ought always to be done as quickly as poſſible.

All the bad ſymptoms ariſing from hernia, proceed either from obſtruction to the paſſage of the feces when the inteſtinal canal forms the tumor, or from a ſtoppage of circulation occaſioned by ſtricture on the prolapſed parts; ſo that the danger

danger of the attending ſymptoms, it is evident, will always in a great meaſure depend on the nature and importance of the parts that are protruded.

Thus, when a portion of omentum alone forms the ſubſtance of a hernial ſwelling, as that organ is not ſo immediately neceſſary to life as many of the other viſcera, it is not ſo frequently productive of danger, as when a part of the alimentary canal is either protruded by itſelf, or along with the omentum.

Although this, however, is in general the caſe; yet it ſometimes happens, that even an omental rupture is attended with danger. When the ſtricture is ſo complete, as to put a ſtop to the circulation in the protruded part, mortification with all its bad conſequences muſt enſue. And beſides, the connection between the omentum, ſtomach, and other viſcera, is ſuch that a ſudden deſcent of any conſiderable portion even of omentum, is apt to bring on vomiting, hickup, and other ſymptoms of diſtreſs. And, laſtly, although a rup-

ture

ture containing omentum only, might not of itſelf prove hazardous; yet as the paſſage through which the omentum has ſlipped, muſt remain open as long as the protruſion continues, and as this muſt render it eaſy for a portion of gut likewiſe to get down, this of itſelf is a ſufficient reaſon for beſtowing even upon an omental hernia our moſt ſerious attention.

But whatever the contents of herniæ may be, whenever ſtricture occurs on them, ſufficient to produce either a ſtoppage of the circulation, or of the fecal contents of the alimentary canal when a portion of gut forms the diſeaſe, the following in general are the ſymptoms that take place.

An elaſtic colourleſs ſwelling is obſerved at the part affected; a ſlight pain is felt, not only in the tumor itſelf, but, if part of the alimentary canal is down, an univerſal uneaſineſs is perceived over the whole abdomen, and the pain is always rendered worſe by coughing, ſneezing, or any violent exertion. The patient complains

plains of nauſea; an inclination to retch; he can get no diſcharge by ſtool; he becomes hot and reſtleſs; and the pulſe is commonly hard and quick.

If the ſwelling is entirely formed by a portion of gut, and if no feces are contained in it, it has a ſmooth, equal ſurface; and although eaſily compreſſible, it inſtantly returns to its former ſize on the preſſure being removed. But, in gut ruptures of long duration, where hard feces have collected in the protruded bowels, firm inequalities very commonly take place.

When again the tumor is compoſed both of gut and omentum, its appearance is always unequal: It feels ſoft and ſomewhat like dough, nor is it ſo elaſtic as when part of the inteſtinal tube only is down; for although like the other it is compreſſible, it does not ſo readily regain its former dimenſions on the preſſure being taken off.

It has been a received opinion, that in ſtrangulated hernia, the ſymptoms ſhould

be leſs violent when the inteſtine is accompanied with a portion of omentum, than when the gut alone is down. Little or no difference, however, occurs from this; for when the gut becomes obſtructed and inflamed, the ſymptoms which enſue are nearly the ſame whether the omentum is down or not.

It will readily, however, be ſuppoſed, that the ſymptoms deſcribed above, can never take place from the preſence of omentum only; for although ſtricture produced on a portion of omentum, even when no part of the inteſtinal tube is down, may excite much diſtreſs, ſuch as pain, ſickneſs, vomiting, and twitching pains through the whole belly; yet no obſtruction of the gut ever occurs from it, and of courſe none of the ſymptoms ever prove ſo alarming as when any part of the gut is concerned.

If the ſymptoms ariſing from a ſtrangulated gut, are not ſoon obviated by the ſtricture being removed, the nauſea and retching terminate in frequent vomitings, firſt

firſt of a bilious, and afterwards of a more fetid matter; the belly becomes tenſe; the pain more violent; a diſtreſsful convulſive hickup takes place; the fever, which at firſt was of little importance, begins to increaſe; the patient is all along exceedingly reſtleſs, and continues in a diſagreeable ſtate of anxiety through the whole courſe of the diſeaſe.

Theſe ſymptoms having for ſome time gone on with violence, the patient is apt at laſt to be ſuddenly relieved from pain, when he flatters himſelf that every riſk is at an end: But inſtead of this, the pulſe, from being hard and frequent, becomes languid and interrupted; cold ſweats break out over the whole body, and eſpecially on the extremities; the eyes become dull and languid; the tenſeneſs of the abdomen ſubſides, and the tumor in part diſappears; the ſkin covering the tumors, which before was either of a natural appearance, or red and inflamed, now becomes livid, and a windy crepitous feel is diſtinguiſhed

diſtinguiſhed in the ſubſtance of the tumor.

If the protruded parts have not of themſelves gone entirely up, their return is now in general eaſily effected with gentle preſſure, and the patient then diſcharges freely by ſtool; but the cold ſweats increaſing, the hickup turns more violent, and death itſelf is at laſt uſhered in by its uſual fore-runners, ſubſultus tendinum, and other convulſions.

Theſe are the ordinary ſymptoms of what is termed a ſtrangulated or incarcerated gut rupture; that is, when the parts protruded become ſo affected by ſtricture, as to produce pain; and do not either return to their natural ſituation on the patient getting into a horizontal poſture, or cannot be replaced by the hands of a practitioner.

In whatever ſituation a ſtrangulated hernia may occur, our only rational method of cure muſt conſiſt in the removal of that ſtricture by which the return of the protruded parts is prevented. It is this that

that we are to conſider as the cauſe of the miſchief; and unleſs it is completely removed, nothing effectual can be done for the relief of the patient.

Various methods have been propoſed for the removal of theſe ſtrictures; all of them, however, may be comprehended under two general heads.

I. Such as tend to the reduction of the protruded parts, without the interpoſition of any chirurgical operation uſually ſo called; and,

II. A diviſion of the parts producing the ſtricture, ſo as to admit of a replacement of the deranged viſcera, conſtituting what in general is termed the Operation for the Hernia.

The remedies to be employed for the firſt of theſe, are, a proper poſture of the patient, with the manual aſſiſtance of a practitioner; blood-letting; ſtimulating glyſters; opiates; the warm bath; and proper applications to the tumor itſelf.

As ſoon as a practitioner is called, the firſt circumſtance requiring his attention, is,

is, the posture of his patient, which ought to be such as will most readily favour the return of the protruded parts. Thus, when the tumor is in the groin, or in the fore-part of the thigh, the patient should be so placed, as to raise his thighs and legs considerably higher than his head and trunk; that is, he should be placed nearly perpendicularly upon his head.

This position causes almost the whole quantity of intestines to hang or swing by the protruded parts, and it frequently proves a means of reducing them: Placing the patient's feet over the shoulders of another person, while his body is allowed to hang downwards, and causing him in this posture to be jolted about, has in some instances answered when every other means have been tried in vain.

For the same reason that in the inguinal and femoral hernia this position is more advisable than any other, the usual erect posture of the body becomes most proper in cases of exomphalus or umbilical rupture; and again, a horizontal po-

ſture is moſt likely to prove uſeful in ventral hernia.

While the patient is thus placed in the moſt ſuitable poſture, the ſurgeon ſhould endeavour to aſſiſt the return of the protruded parts, by gentle preſſure with his hands and fingers. In the inguinal or ſcrotal hernia, the preſſure ſhould be made obliquely upwards towards the os ileum, ſo as to correſpond as nearly as poſſible with the opening in the external oblique muſcle. In the femoral hernia, the preſſure ſhould be directly upwards; in the umbilical hernia, downwards and backwards; and in the ventral hernia, directly backwards.

In herniæ of any conſiderable ſize, preſſure is moſt conveniently made, by graſping the ſwelling with one hand from the bottom upwards, while with the fingers of the other we endeavour to puſh forward the contents at the ſuperior part of the tumor. Some ſurgeons, in puſhing forward the inteſtine, employ the fingers of both hands at the upper part of the tumor; but the

the ſame purpoſe is anſwered equally well with the index and middle finger of one hand, while the other is employed with advantage in preſſing the under part of the tumor upwards ſo as to co-operate in this manner in the reduction. It is this operation which by authors is termed the *taxis*. No deſcription, however, can convey an adequate idea of the manner in which it ſhould be performed: for, like many other points in the art of ſurgery, a knowledge of it can only be obtained from experience and obſervation: But this muſt always be had in view, that any preſſure we employ ſhould be of the moſt gentle kind; for whatever creates much pain, proves prejudicial, and ought to be avoided.

In attempting to reduce the contents of herniæ, ſo much force is often employed, and in ſuch a rough manner, as can ſcarcely fail to injure the protruded parts: Nor is the riſk, that enſues from this, ever compenſated by the practice proving more ſucceſsful; for where a proper application

of gentle preſſure does not anſwer, we never ſucceed with much force.

If moderate preſſure, therefore, does not ſoon prove effectual, other means ſhould be immediately adviſed. Blood-letting is here to be conſidered as a principal remedy; for in no diſeaſe does it afford more relief. The quantity to be taken muſt in a great meaſure depend on the ſtrength of the patient: but if in any caſe we can with propriety venture upon abſtracting large quantities of blood from weakly patients it is here; and we often perceive with ſurpriſe to what length it may be carried without hurting the ſyſtem. A ſtate of deliquium being known to produce more complete relaxation of all the muſcular parts of the body, than can be obtained in any other way, it has ſometimes been adviſed, in the treatment of hernia, to take off ſuch large quantities of blood, and in ſuch a ſudden manner, as to excite fainting; and the practice has in ſome inſtances proved effectual.

As obſtinate coſtiveneſs is commonly one of the moſt alarming ſymptoms of hernia, it has been the prevailing practice to preſcribe not only ſtimulating purgatives by the mouth, but injections of the moſt acrid kind. In judging, however, from experience, I would ſay, that the practice ſhould not be adopted; for when it does not prove uſeful, it very univerſally does harm, by increaſing the ſickneſs at ſtomach which always prevails here, while at the ſame time it adds to the pain and tenſion of the tumor. I am clearly, therefore, of opinion, that remedies of this claſs ſhould not be puſhed ſo far as is commonly done; and inſtead of purgatives by the mouth, I would recommend injections of tobacco-ſmoke. A variety of machines have been invented for injecting ſmoke by the anus; but none anſwer the purpoſe ſo well as the inſtruments repreſented in Plates LXIII. and LXIV. They are eaſily procured; and by means of either of them, ſmoke may be injected with any neceſſary force.

I would not have it ſuppoſed, however, that I recommend tobacco-ſmoke uſed in this manner as an infallible purgative, as many have done. For the contrary is certainly the caſe: I have known it uſed in various inſtances, both of hernia and ileus, and not often with advantage. I only adviſe it as the moſt effectual remedy of this claſs with which I am acquainted; and I know that this mode of injecting it, is the moſt effectual hitherto invented. It has been objected to the inſtruments I have delineated, that we cannot by means of them aſcertain the quantity of ſmoke we inject. But this is a nicety of little importance; as the rule in all ſuch caſes ſhould be, to continue to throw up the ſmoke, either till it has produced the wiſhed-for effect; till a conſiderable degree of ſickneſs is induced; or till the abdomen is found to be diſtended, for which in ſome patients much more is required than is found to anſwer in others.

But although this remedy does not frequently anſwer as a purgative, it proves often

ten uſeful as an anodyne both in hernia and ileus. And as we are often in ſuch caſes deprived of the advantage of opium, by the ſtomach not being able to retain it, we may occaſionally, in ſevere degrees of pain, have recourſe to glyſters of tobacco-ſmoke, as one of the beſt means of procuring eaſe.

Among the liſt of purgatives employed in herniæ, acrid ſuppoſitories, compoſed of ſoap, aloes, and other ſtimulating materials, have been much recommended; and when remedies of this claſs are to be uſed, theſe may be conſidered as a neceſſary addition to the others; but no great dependence ſhould ever be placed on them.

We are told, indeed, that in ſome caſes of hernia, draſtic purgatives have been of advantage; but I have ſo frequently known them do harm, by increaſing the nauſea, pain, and inflammation of the ſtrangulated gut, that I am under no difficulty in ſaying that they ought never to be uſed.

Opiates prove often uſeful, not only by relieving pain, but as tending to relax thoſe parts which, by being preternaturally conſtricted, we conſider as the principal ſeat of the diſeaſe. I have already obſerved, however, that the retching which takes place in moſt caſes of hernia, prevents the exhibition of opiates by the mouth; but in ſuch inſtances they may be applied with advantage in the form of injection, and their uſe may be alternated with injections of tobacco-ſmoke, as I have already pointed out.

Warm bathing is another remedy from which much advantage has been derived in the treatment of herniæ: Not the local application of heat, however, as conveyed in the form of poultices and fomentations, but the univerſal warm bath, in which the whole body is immerſed, and which we know to be poſſeſſed of very relaxing powers.

Immerſing the whole body in a warm bath, by tending to relax the conſtriction on the protruded inteſtines, may prove uſeful

ful by promoting their replacement; but the local application of heat to the ſwelled parts, although commonly adviſed, is very apt to do harm. On the conſtricted tendon it can have no influence, for it lies ſo deep as to be little affected by remedies of this kind. And as the heat conveyed in this manner muſt tend to rarefy the contents of the tumors, and muſt thus increaſe the bulk, inſtead of anſwering any good purpoſe, on this principle it is evident they muſt do harm; and accordingly, whoever will attentively obſerve their effects, will find that they do ſo. When the external teguments are much inflamed and painful, by their emollient properties, they may afford relief; but the eaſe thus obtained proves only momentary, as the pain commonly ſoon becomes more ſevere than it was before.

Whoever attentively conſiders the nature of hernia, and the means that prove moſt effectual in the cure, muſt be of opinion, that all the bad ſymptoms that appear in it, ariſe from ſtricture produced upon

upon the protruded parts. By ſome, however, a different opinion has been held forth, and all theſe ſymptoms have been imputed to ſpaſm or inflammation in the protruded parts themſelves, independent of ſtricture or any other affection of the parts through which they have paſſed.

That inflammation of the prolapſed bowels, in whatever way it may be induced, will, in general, terminate in all the ſymptoms of ſtrangulated hernia, no perſon will doubt; but that ſtricture in the tendons, through which the bowels have paſſed, is the moſt frequent cauſe of this inflammation, is alſo obvious. Admitting, however, that the cauſe of all the bad ſymptoms in hernia ſhould originate in the parts that have been protruded, and that they are not induced by the opening through which they have paſſed, being leſſened by ſtricture, ſtill the application of heat to this kind of tumor muſt be improper, as the rarefaction which it excites, by giving an increaſed bulk, muſt neceſſarily increaſe the danger.

While

While we might, à priori, be warranted to argue in this manner, I can from practice and experience assert, that we derive more advantage from the external application of cold than I have ever perceived from any other remedy. In various instances I have applied ice and snow with much advantage, and I never saw them do harm *. But, in general, the remedies upon which I depend are, cold saturnine solutions, and cloths kept constantly moist with a mixture of cold water, vinegar and brandy.

By these remedies alone we sometimes succeed, without further assistance: But it frequently happens, notwithstanding every attempt, that the protruded parts cannot be returned; the symptoms, instead of abating, become more violent; and the event of the disease becomes of course more doubtful.

In

* By some writers, this practice has been considered as hazardous; but I find it recommended by others to whom much credit is due, particularly by the late Dr Monro. See his works, 4to edition, p. 559.

In this situation, we should again endeavour to return the contents of the tumor, by a proper application of pressure with the hand, assisted with due attention to the posture of the patient; but where this does not soon prove successful, the division of the parts by which the stricture is produced should be advised as our only resource.

This, it may be remarked, is one of the most important points on which a surgeon has ever to decide: I mean the exact period at which the treatment of hernia, by means such as I have pointed out, should be laid aside, and the operation be put in practice. If a surgeon, without having given a full trial to all the usual remedies, should early proceed to the operation, and if unfortunately it should not succeed, he would probably be blamed by the friends of the patient as the principal cause of his death; and again, even allowing a recovery to be obtained by the operation, he is apt to be blamed, not only by his brethren of the profession,

but

but by the patient himſelf, for having made him ſuffer an unneceſſary degree of pain.

In ſuch circumſtances, a practitioner is very apt to feel himſelf embarraſſed. But we ought here, as in every critical ſituation, to be entirely directed by experience; and if this rule was kept in view, inſtead of the uſual delays in almoſt every inſtance of ſtrangulated gut, we would adviſe the operation at a more early period.

The operation of the hernia is no doubt liable to ſome hazard; but the danger attending it has by many been magnified more than it ought to be; for, ſo far as I can judge from experience, the riſk from the operation being long delayed, is infinitely greater than from the operation conſidered abſtractedly.

Were we able, from the ſymptoms, to determine the exact period at which the operation ſhould be performed, no kind of difficulty would occur from it; but this is ſo far from being the caſe, that the moſt experienced ſurgeons ſeldom agree on it.

In

In ſome inſtances, hernia, with every ſymptom of ſtrangulation, continues for ſix, eight, or ten days; and after all, the protruded parts are replaced, and the patient does well: and in many ſimilar caſes when the operation has afterwards been found neceſſary, although the ſevereſt ſymptoms may have ſubſiſted for ſeveral days, yet, on laying the parts open, no appearances either of inflammation or gangrene have been diſcovered.

With others, again, the ſame ſet of ſymptoms, with perhaps no more tenſion in the tumor, prove quickly fatal. In ſome of theſe, the rapid progreſs of the diſeaſe is often aſtoniſhing; the ſpace of forty-eight hours hardly intervening, from the firſt attack till the death of the patient: I have even known the inteſtines become perfectly gangrenous in the courſe of one day from the time of their firſt expulſion.

Every practitioner of experience knows, that this is the ſtate of the queſtion; and if ſo, it muſt at once be obvious, that long

delays

delays must in such critical circumstances be always hazardous; and as the danger from the operation itself, is trifling when compared with the risk accruing from delays, it ought, I think, to be an established maxim, to proceed in every instance to the operation, if in the space of a short time blood-letting and the other remedies that I have mentioned, or which happen to be used, do not prove effectual. Two or three hours at farthest, even when practitioners are early called in, is, perhaps, the greatest length of time that should be consumed in trials of this kind.

In the treatment of herniæ, it has been remarked, that the French surgeons prove usually more successful than German or British practitioners; and so far as I know, no reason can be assigned for the difference, but that the French proceed more early to the operation than the surgeons of almost any other nation. They will thereby, no doubt, perform it on some patients who might have recovered by more gentle means; but any inconvenience

nience ariſing from this to a few, is fully compenſated by the number of lives that muſt be ſaved by having recourſe to it in due time, which otherwiſe might probably have been loſt.

Although for obvious reaſons the reduction of the contents of herniæ ſhould in every inſtance be attempted, yet caſes often occur in which it cannot be accompliſhed.

When the reduction has once been completed, we have it in our power to prevent the diſeaſe from returning, by the conſtant application of a proper truſs to the opening at which the parts were puſhed out. But, from this being neglected, ruptures which might at firſt have been eaſily cured, come at laſt by repeated deſcents, and by the great quantity of parts that fall down, to form tumors of ſuch magnitude, in proportion to the opening through which they were forced, that no art can replace them by the more ſimple means of reduction.

But

But besides this, such adhesions frequently take place, between the viscera forming the swelling and the surrounding parts, as render it impossible to return them by any other means than the operation. By this, indeed, perhaps every case of hernia may be reduced; but, however necessary this operation may be when a patient is in danger, as it is always attended with some hazard, it should seldom be advised where symptoms of strangulation do not actually exist.

In that indolent or chronic state of hernia we have just been describing, although by interested and ignorant practitioners the operation has been often proposed as a radical cure, yet surgeons of character would in such circumstances seldom advise it: They would rest satisfied with preventing any accumulation of feces in the intestines, by prescribing a proper diet, and the occasional use of gentle laxatives; and with obviating, by a suspensory bandage, any inconvenience that

might ariſe from the weight of the tumor.

By theſe means alone, even the largeſt herniæ are often made eaſy and ſupportable for a great length of time; the circulation of the parts contained in the ſwelling goes freely on, as well as the periſtaltic motion of ſuch parts of the alimentary canal as are protruded; and hence it is, that we have many inſtances of large portions of the gut falling down even to the bottom of the ſcrotum, and continuing there for a great number of years, without giving any interruption to the uſual diſcharge by ſtool.

In this ſtate of the diſeaſe, therefore, the operation can ſeldom be admiſſible. But although people with hernia in this ſituation frequently enjoy good health, and ſometimes feel little inconvenience from the tumor, yet it muſt not be ſuppoſed that their ſituation is free of danger: On the contrary, we often obſerve, that the diſeaſe, after ſubſiſting in this ſtate for a great length of time, will inflame and

become

become painful, ſo as to excite every bad ſymptom commonly induced by real ſtrangulation of a gut. As long, too, as the tumor continues, as the opening through which the parts have been puſhed is thereby prevented from cloſing, ſo the patient ſtill remains liable to deſcents of other portions of inteſtine which have not formerly been down, and by which the moſt fatal ſymptoms may be induced. But what I here wiſh to eſtabliſh is, that, till once theſe bad ſymptoms actually occur, either from an affection of that part of the gut which has been long down, or of a portion more recently protruded, the operation for the hernia ought ſeldom to be adviſed. All that can here be done with propriety is, to fit the patients with proper ſuſpenſory bandages; to warn them of the riſk they will incur from laying them aſide; and to caution them againſt violent exerciſe, particularly leaping, and every ſudden exertion.

Although with practitioners of reputation this circumſtance cannot require

much discussion, yet the public at large are much concerned in it. The former know, that the operation should be seldom performed in any case of hernia where violent symptoms do not actually exist; but the latter, not being able to judge of the various circumstances to be taken into consideration, are too frequently imposed on by that numerous set of itinerants with which every country abounds. By these a variety of operations are put in practice for performing what they call a radical cure of ruptures; by which they mean to say, a prevention of future descents.

But as no remedy with which we are acquainted, a well-adapted truss only excepted, can be depended on for this purpose; and as all the other means that have been advised for it, are not only painful, but highly dangerous, the magistracy of every community ought to interfere in suppressing them.

The object in view by all these attempts, is, either to destroy the hernial sac entirely, or

or to procure an accretion of its ſides; which, by thoſe who are ignorant of the anatomy of the parts concerned, has been conſidered as ſufficient to prevent any return of the diſeaſe.

In order to effect a total deſtruction of the ſac, our forefathers employed not only the knife, but the potential and even the actual cauteries; and with a view to produce a firm union of its ſides, which was conſidered as equally effectual, it was afterwards propoſed by practitioners of more tender feelings, to employ the needle, and ligature, or what was termed the Royal Stitch: and for the ſame purpoſe was invented the famous *punctum aureum*, which was performed in the following manner. After reducing the inteſtines into the abdomen, the ſac was laid bare with a ſcalpel; and a piece of gold wire being paſſed round the upper end of it, the wire being likewiſe made to include the ſpermatic cord, it was then ordered to be twiſted with forceps to ſuch a degree of tightneſs as to prevent the de-

ſcent of the gut, but not to interrupt the circulation in the ſpermatic cord *.

But none of theſe methods being found to anſwer, for even the actual cautery, although carried to the depth of the bone itſelf, does not ſecure the patient againſt a return of the diſeaſe, our modern pretenders have therefore ventured to improve upon the ignorance of ancient practitioners, and actually go the length of deſtroying, not only the hernial ſac, but the teſtis alſo: without any knowledge of the anatomy of the parts, and having no reputation that can ſuffer by any conſequences that enſue, they proceed without fear; and, by promiſing all that patients can hope for, they are ſure to be well received. In conſequence of this, in every large town, many operations are performed by them; numbers are accordingly mutilated, and many thereby even loſe

* For a more particular account of theſe various modes of practice in hernia as employed in former times, ſee the writings of Albucaſis, Paulus Ægineta, Fab. ab Aquapendente, Hildanus, and Ambroſe Parey.

loſe their lives. Their method of operating is ſhortly this: They lay bare the hernial ſac, and having reduced the prolapſed parts, a ſtrong ligature is paſſed round both the ſac and ſpermatic cord, and drawn ſo tight as to deſtroy, not only the paſſage along the ſac, but the cord itſelf, and of courſe the teſticle. In ſome inſtances nothing further happens; but in others, ſuch a degree of inflammation is induced, as to terminate in the death of the patient.

If any of theſe means, however, were to produce the wiſhed-for effect, the prevention of future deſcents, the riſk would in ſome meaſure be compenſated by the advantage: But the fact is much otherwiſe; for unleſs a truſs is kept conſtantly applied, the patient continues liable to a return of the diſeaſe in nearly the ſame degree as if no operation had been performed. Even the operation for the hernia itſelf, does not, as has been ſuppoſed, fortify the parts againſt a return of the diſeaſe, the continued uſe of a truſs be-

ing nearly as neceſſary after that operation as if it had not been performed.

In a few caſes, the opening may be ſo completely cloſed by the inflammation induced by the operation, that no farther deſcents would take place; but as I have known different inſtances of its failure, in which, from neglecting to wear a truſs, the diſeaſe returned with the ſame ſymptoms of ſtrangulation as before, I can without heſitation ſay that the principle ſhould be adopted.

In Plate LXV. truſſes are repreſented for different varieties of hernia. They are intended for the more uſual forms of the diſeaſe, the inguinal, crural, and umbilical rupture. When others are wanted for particular parts, tradeſmen in this line of buſineſs ſhould be applied to, with directions to fit the inſtruments with the niceſt exactneſs to the parts for which they are intended. Indeed, the advantages to be obtained from a truſs, depend entirely on the exactneſs with which it is fitted; and nothing but the niceſt atten-

tion

tion can prevent it from doing more harm than good. The ſole purpoſe of a truſs is to prevent the parts newly replaced from falling down. If therefore the pad or bolſter with which it is furniſhed does not bear properly againſt the opening upon which it is placed, a portion of gut may ſlip out, and be materially injured by the preſſure of the pad. I have met with different inſtances of this, where bandages by not being exactly fitted did much harm, and every practitioner muſt have obſerved them: it is therefore a matter of the firſt importance, that tradeſmen be made to pay the moſt exact attention to this. All rupture-bandages ſhould be of the ſteel ſpring kind; for thoſe formed of linen and other ſoft materials, can never be kept properly applied. Even in infancy the ſteel truſs may be made ſo light and eaſy as to be uſed with ſafety.

Having premiſed theſe general obſervations, which relate equally to every variety of hernia, I ſhall now proceed to conſider more particularly the different forms of the diſeaſe.

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SECTION II.

Of the Bubonocele.

CONJOINED with the general ſymptoms of hernia enumerated in the laſt ſection, the particular appearances of the bubonocele, or inguinal hernia, are, a ſoft ſomewhat elaſtic tumor, beginning in the groin, and deſcending by degrees into the ſcrotum in men, and labia pudendi in women. When a portion of gut forms the diſeaſe, the tumor is commonly tenſe in proportion to the degree of ſtricture in the opening of the tendon; and when the parts inflame, handling or preſſure always gives pain.

When it contains omentum only, the tumor is both more ſoft, compreſſible, and more unequal, than when gut alone is down; the ſcrotum becomes more oblong than

than in an inteſtinal hernia ; and when the quantity of omentum is large, it is alſo much more weighty than a gut rupture of the ſame ſize : But in a great proportion of caſes, the tumor is compoſed both of gut and omentum : In this caſe the diſtinguiſhing ſymptoms of each can never be ſo clearly marked. Various ſymptoms indeed are enumerated by authors for diſtinguiſhing the contents of herniæ ; but whenever the caſe is complicated, every candid practitioner will admit, that no certainty can be obtained of this till the tumor is laid open.

As theſe parts are liable to other tumors with which the inguinal and ſcrotal hernia may be confounded, practitioners ſhould be as much as poſſible acquainted with the marks of diſtinction. Theſe tumors are, glandular or other ſwellings in the groin, whether from the venereal diſeaſe or any other cauſe ; that ſwelling of the teſtis termed Hernia Humoralis ; and the different varieties of hydrocele.

The

The venereal bubo and other glandular tumors in the groin, are diſtinguiſhed from hernia, not only by their wanting all the general ſymptoms of hernia, but by that incompreſſible hardneſs with which glandular ſwellings are at firſt attended, and by the fluctuation of matter which in their ſuppurated ſtate is obſervable.

In the hernia humoralis, the hardened and enlarged ſtate of the teſticle; its being exquiſitely painful to the touch; remarkably heavy in proportion to its bulk; and the ſpermatic proceſs being commonly free from ſwelling; may be conſidered as certain marks of diſtinction. In the hernia humoralis, too, the inteſtines are free and unobſtructed, and the other general ſymptoms of hernia are wanting.

In the hydrocele of the tunica vaginalis teſtis, the tumor in general is more equal than in hernia: In the former, it begins in the under part of the ſcrotum, and proceeds upwards; whereas the reverſe occurs in hernia. In hydrocele the ſpermatic cord is in moſt inſtances diſtinctly

ly felt, whereas in hernia where the tumor descends to the scrotum, the spermatic cord cannot in any part of its course be distinguished. In hydrocele, the fluctuation of a fluid is distinguishable; in hernia it is not.

From the anarsarcous swelling of the scrotum, or hydrocele of the dartos as it is termed, hernia is easily distinguished; and indeed the means of distinction are so obvious, that they need not be enumerated; but there is another variety of hydrocele, the hydrocele of the spermatic cord, which in some instances it is difficult to distinguish from hernia, and which therefore requires particular attention.

Where the water is collected in one or more cells of the spermatic process, and begins in the under part of the cord, and proceeds upwards, this alone serves as sufficient means of distinction between it and hernia, in which the swelling must always proceed from above downwards; but it sometimes happens, that the water

begins

begins to collect even within the opening of the abdominal muſcle, and by degrees falls downwards. In this caſe we cannot determine from the ſtate of the tumor alone, whether it is the one diſeaſe or the other. The general ſymptoms of hernia, ſuch as pain and tenſion of the abdomen, vomiting, and obſtructed inteſtines, muſt be kept in view; for not being connected with hydrocele, they ſerve to aſcertain the nature of the caſe, in which their abſence might long remain doubtful. In ſome caſes, however, theſe and every other means of diſtinction are wanting; but even in ſuch circumſtances a practitioner of experience will never incur the riſk either of hurting his patient, or his own reputation, which the miſtaking a Hernia for a Hydrocele, and treating it as ſuch, muſt always do, and which, to the diſgrace of ſurgery, has in ſome inſtances been done.

In all ſuch caſes of doubt, as well as in every tumor of the teſticle where the moſt perfect certainty is not obtained, and in which

which an operation becomes neceſſary, the ſurgeon ſhould proceed as he would do in hernia: By doing ſo, every riſk will be avoided: On the tumor being laid open, the true nature of the diſeaſe will become evident, and the practitioner will be at liberty to apply the means beſt ſuited for the cure. Whereas in proceeding differently as in ſome caſes has been done, and treating as a hydrocele what afterwards proves to be hernia, he not only incurs the riſk of injuring his own reputation, but of deſtroying his patient.

In the treatment of the Bubonocele, when the means pointed out in the laſt ſection as applicable to every ſtate of hernia do not ſucceed, we are then under the neceſſity of proceeding to the operation; and the method of doing it is this:

A table of a convenient height being fixed in a proper light, the patient muſt be placed upon it with his head and body almoſt horizontal, whilſt his buttocks are raiſed with pillows beneath them. The legs hanging over the edge of the table

muſt

muſt be ſeparated ſo as to admit the operator between them; and ſhould in this ſituation be firmly ſecured by an aſſiſtant on each ſide, who ſhould take care at the ſame time to keep the thighs ſo far raiſed as to relax the abdominal muſcles.

That we may obtain as much empty ſpace as poſſible for returning the protruded parts, the patient ſhould be adviſed to empty his bladder; and the parts having been previouſly ſhaved, an inciſion muſt now be made with a ſcalpel through the ſkin and part of the cellular ſubſtance, beginning an inch above the ſuperior end of the tumor, and proceeding down to the moſt depending part of the ſcrotum. Even where the tumor does not reach to the bottom of the ſcrotum, the parts ſhould be laid open in this manner. By a free external inciſion, we are enabled to finiſh the operation with more eaſe than when the firſt opening is ſmall: it does not give much more pain; and being continued to the bottom of the ſcrotum, the matter in the upper part of the ſore is prevented from

from collecting below, which otherwise it is ready to do.

The operator must now proceed to divide the rest of the cellular substance covering the sac; and even this should be done with caution: For although in a great proportion of cases, the spermatic vessels lie behind the protruded parts, yet occasionally they are found on the anterior part of the tumor; so that in order to avoid the risk of wounding them, as soon as the skin is divided, the remainder of the operation should be conducted with much attention, care being taken to avoid every large bloodvessel that makes its appearance.

This circumstance of the prolapsed parts getting down behind the spermatic vessels, has never, so far as I know, been mentioned by authors: It must therefore be a rare occurrence. As I met with it, however, in one case, where the fact was obvious, the possibility of its happening I have no reason to doubt. If we attend only to the usual conformation of these

parts, the hernial ſac, we would ſay, ought never to get behind the ſpermatic cord: But we know well, that in no part of the human body is nature more apt to deſert her ordinary courſe, than in ſome circumſtances relating to the teſtes and their bloodveſſels. I have already obſerved, that till near the period of delivery, the teſticles continue in the abdomen; and about this time, that they fall down in a gradual manner to the ſcrotum. Many inſtances, however, occur, of both teſtes remaining in the abdomen through life; while ſometimes one remains, and the other falls into the ſcrotum. In others, one or both fall into the groin, and never proceed farther; a circumſtance which young practitioners ſhould be aware of, as inſtances have occurred of a teſticle reſting in the groin being miſtaken for a hernia, and of much pain being excited by attempts made for reducing them. Now, if we frequently meet with ſuch varieties as this in the mechaniſm of theſe parts, why may not nature ſometimes pro-

duce

duce ſuch a conformation as, on a hernial ſac falling into the ſcrotum, may place it behind both the ſpermatic cord and the teſticle? And as I have ſhewn that it has happened, and as it may therefore occur again, I conſider it as a farther argument for the propriety of dividing the parts in the cautious manner I have mentioned *.

It is uſual, in making the firſt inciſion, to pinch up the teguments, and then to divide them with a ſcalpel; but no ſurgeon of ſteadineſs and dexterity will ever proceed in this manner. This inciſion of the ſkin is done with much more neatneſs, and with equal ſafety, by the operator graſping the tumor with his left-hand, in ſuch a manner as to render the teguments on the anterior part of it tenſe, while, with the ſcalpel in his right-hand, he divides the ſkin from one end to the other.

* Since this went to the preſs, I find that an inſtance is recorded by Le Dran, in his *Treatiſe of Ruptures*, of the ſpermatic veſſels having been found on the anterior part of a bubonocele.—This ſituation, therefore, of theſe veſſels, is perhaps more frequent than is commonly imagined.

The ſac being laid bare, an opening muſt be made in it, ſo as to bring its contents into view; and the moſt ſafe place for this being formed, is, not about the middle of the tumor, as is commonly directed, but as near to the under point of it as poſſible: It is here done with the ſame eaſe as in any other part; and beſides, the gut is ſeldom found juſt at the bottom of the ſac, which is commonly occupied with a quantity of bloody ſerum; ſo that the riſk of wounding it in this ſituation, is leſs than in any other part of the tumor. In making this perforation of the ſac, conſiſts the greateſt nicety in the operation, the utmoſt caution being neceſſary to avoid the parts which it contains. Good eyes and a ſteady hand are in no operation more requiſite than in this: With theſe, any practitioner acquainted with the anatomy of the parts, will do the operation properly, and without them the beſt anatomiſt muſt go wrong.

With the ſame ſcalpel that divided the ſkin and cellular ſubſtance, the operator

muſt

muſt proceed ſlowly, dividing one fibre of the ſac after another, till an opening is formed in it; which may be always diſcovered with the blunt end of a probe: If the probe paſſes in eaſily, we may conclude with certainty that the ſac is divided; and if it does not, the inciſion muſt be continued in the ſame gradual manner ſomewhat deeper, when the ſame trial with the probe muſt be repeated.

In proſecuting this diviſion of the ſac, we derive much advantage from the uſe of a ſmall ſharp-pointed directory, open at the extremity, as is repreſented in Plate LXV. fig. 6. By puſhing the end of it below ſome of the fibres of the ſac, they are eaſily ſeparated from the parts beneath, and may thus be divided with ſafety; and in the ſame manner the reſt of the ſac muſt be divided, till this part of the operation is completed *.

 In

* In the 4th Volume of Memoirs of the Paris Academy of Surgery, there is a paper on Herniæ, by Monſieur Louis. But although it contains many uſeful obſervations,

In almoſt every hernia in the groin, and even where the tumor extends to the ſcrotum, if the parts are recently protruded, the hernial ſac is thin, and therefore eaſily cut through; but it is neceſſary for the information of young practitioners, to obſerve, that when hernia is of long duration, the ſac frequently becomes ſo thick, as to require much more diſſection than beginners commonly expect: By going on, however with the caution I have directed,

vations, Mr Louis in one point I think has gone far wrong, in ridiculing that degree of caution which in dividing the hernial ſac is unqueſtionably requiſite: The diviſion of the ſac, he ſays, is attended with ſo little difficulty, that he does not conſider it as different in that reſpect from the firſt external inciſion of the ſkin. His words are: "Jamais le ſac ne m'à donné ni plus de peine, ni plus d'embarras que la peau; on diviſe, pour ainſi dire, celle-ci du *premier trait*, et le ſac *du ſecond*." In the hands of a very expert operator, the ſcalpel, even in this manner, may be ſo managed as to do no harm; but, in common practice, much miſchief would be done by proceeding as Mr Louis has directed. It might tend to ſhow the dexterity of an operator, but this would always be at the hazard of the patient.

directed, every risk of wounding any part of importance may be avoided.

As soon as an opening is made through the sac, a circumstance of which we become certain, as I remarked above, by a probe passing easily in, it ought then to be farther enlarged, by cutting upon the director, till it is of such a size as to admit the fore-finger of the operator.

The fore-finger of the left-hand must now be introduced, and used as a director for entering the narrow blunt-pointed bistoury, represented in Plate LXIV. fig. 3. with which the hernial sac must be divided along its whole length up to the opening in the external oblique muscle. With the finger used as a director for the bistoury, this part of the operation is performed with safety; and the bistoury here delineated, renders all the instruments formerly employed not only for this part of the operation, but for the subsequent division of the tendon, quite unnecessary.

On laying the sac open at the bottom, a quantity of coloured fluid commonly

rushes out, and the protruded parts come fully in view: If a portion of gut is down, and not much entangled with omentum, by being now set at liberty, more of it comes instantly on the sac being opened; thereby giving the appearance of having been collected in a larger quantity than the size of the tumor gave reason to expect.

The portion of gut that we meet with in hernial swellings is various, no part of the intestinal canal being entirely exempted from falling down. Hitherto the ileum has been commonly supposed to form the substance of a great proportion of herniæ, but later and more accurate observation renders it probable that the cæcum, appendix vermiformis, and part of the colon, are perhaps as frequently contained in herniæ as any other portion of gut.

The sac being laid fully open, the parts contained in it should be examined with the nicest attention, in order to discover whether they are found or not; and if upon attentive inspection they appear to be found,

ſound, that is, if they are not evidently in a ſtate of gangrene, even although they ſeem to be inflamed, they ſhould be immediately returned into the abdomen.

Whether inteſtine or omentum, or a portion of each, have been contained in the tumor, thoſe parts of them which have come laſt down ſhould be firſt puſhed back, the difficulty and trouble of returning them being thereby much leſſened: And in making the reduction, it both anſwers the purpoſe better and is leſs likely to do harm, to apply the fingers to that part of the inteſtine connected with the meſentery than to the convex part of it. While the reduction is going on, the patient's thighs and loins ſhould be ſtill more elevated than they were during the preceding ſteps of the operation; for this poſture of theſe parts tends much to facilitate the return of the protruded inteſtines to the abdomen.

When the diſeaſe is recent, and the parts have not been frequently down, it ſometimes happens, that by pulling out a little

more

more of the gut, the difficulty that occurred to the reduction is thereby removed; and if the protruded parts are not of great magnitude, they may thus be sometimes reduced, without the opening being enlarged by which they passed from the abdomen: But when this cannot be done with ease, it should never be attempted; more danger being to be dreaded from force applied to the gut, than can ever occur from finishing the operation by enlarging the opening in the tendon of the external oblique muscle.

As the tendon of this muscle runs in an oblique direction from above downwards, and as the opening through which the contents of a hernia protrude, is formed by a separation of the tendinous fibres of the muscle from each other, the direction of this opening is of course the same with that of the tendon; that is, it runs somewhat obliquely from the spine of the ileum to the os pubis.

In enlarging this passage, then, for the reduction of the parts that have passed through

through it, as a tranſverſe ſection of the tendon is not neceſſary, the knife ſhould be carried obliquely upwards, ſo as merely to continue the natural ſeparation of the tendinous fibres.

The finger was recommended as the beſt director for the knife in opening the ſac, and in dividing the tendon it proves equally uſeful. By inſinuating the finger into the aperture of the tendon immediately above the protruded parts, the point of the blunt biſtoury, Plate LXIV. fig. 3. is eaſily introduced upon it; and in this manner, by keeping the end of the finger a little before the biſtoury, the opening may be enlarged to any neceſſary extent without riſk of wounding the contiguous parts.

In general, a very ſmall enlargement of the natural opening in the tendon proves ſufficient: But the ſize of the opening ſhould be fully equal to the object in view; for it is better to make it ſomewhat too large, than to run any riſk of hurting the gut by forcing it through a ſmall aperture.

If

If on the introduction of the finger any adhefions of the gut to the contiguous parts are difcovered, the incifion in the tendon fhould be made larger than might otherwife be neceffary, that the finger may be fo freely admitted, as to deftroy fuch adhefions as it can reach; for if not removed, the operation would very probably fail.

Befides thefe internal adhefions, it fometimes happens, by long confinement in the fcrotum; preffure; and perhaps from other caufes; that ftrong adhefions are formed among the parts contained in the fac: and before reducing them, it is always right to attempt to feparate them.

When thefe adhefions occur, as they fometimes do, between different parts of the gut, they fhould be feparated with much care; but connections of this kind between one portion of gut and another, are feldom firm, and are commonly eafily feparated: when formed by means of long filaments, which is fometimes the cafe, the eafieft method of removing them is to cut them, either with fciffars or a biftoury;

biſtoury; but when one part of the gut adheres ſo firmly to another as not to be ſeparated but with difficulty, it is much better to return the whole even in this ſtate to the abdomen, than to run the riſk of hurting it by employing much force.

When, again, adheſions form between the gut and the hernial ſac, or between the gut and omentum, if the filaments by which they are produced cannot be otherwiſe removed, as there is no great hazard in wounding the omentum, and ſtill leſs from hurting the ſac, a ſmall portion of both may be diſſected off, and returned with the gut to the abdomen; and in like manner, when the omentum adheres ſo firmly to the ſac as not to be ſeparated in any other manner, no danger can accrue from the ſac being encroached on.

The riſk attending this practice is trifling, when compared with the inconveniencies that would enſue from leaving either the omentum or gut adhering externally to the hernial ſac, as is adviſed by ſome when theſe adheſions cannot be eaſily

eaſily divided. The leaſt portion of gut being left down, would run much riſk of being injured by expoſure at the different dreſſings; and by leaving part of the omentum to protrude through the opening from the abdomen, one advantage to be expected from the operation would be loſt, namely, the prevention in future of that riſk to which a patient with a portion of protruded omentum muſt be always liable, of a piece of gut ſlipping down, and perhaps of becoming ſtrangulated.

After returning the contents of the ſac into the abdomen, it has been propoſed by ſome, to paſs a ligature round the upper part of the ſac juſt at its neck, with a view, as we are told, of procuring a reunion of its ſides, in order that it may ſerve as a means of preventing future deſcents of the bowels.

But as a ligature cannot be applied in this manner without riſk of injuring, or even of deſtroying the ſpermatic veſſels, with which the poſterior part of the ſac is immediatly connected, the practice, from this

this consideration alone, should be laid aside; but in reality it does not appear to be necessary, as this very union of the sides of the sac is always produced merely by that degree of inflammation which succeeds to the operation.

Hitherto I have advised the contents of herniæ to be immediately reduced, on the supposition that they have been only displaced; that they have been adhering to each other or to the neighbouring parts; or perhaps that they have been more or less in a state of inflammation. But when it appears that this inflammation has already ended in gangrene, as the return of mortified parts, whether omentum or intestine, might be attended with hazard, more caution is required.

When the omentum is found in a state of mortification, as a portion of it may be removed without much risk, it has been the common practice to cut off the diseased parts; and in order to obviate any inconvenience from the hemorrhagy that might ensue, we are advised to make a ligature

gature on the ſound parts previous to the removal of thoſe that are mortified; while, by leaving the ends of the ligature hanging out of the wound, the ſurgeon has it in his power to remove it whenever he may think fit.

Ligatures on the omentum, however, having frequently induced bad ſymptoms, ſuch as nauſea, vomiting, cough, fever, pains in the belly, and inability to ſit erect; and as we now from experience know, that no hemorrhagy of importance ever occurs from its being divided, ſuch parts as have become gangrenous may therefore be freely cut off, and the remaining ſound parts be introduced into the abdomen, without ligatures being put upon them. Of this I am convinced from experience, and it is alſo the opinion of others *: But if it ſhould ever happen, on cutting

* A very accurate paper upon this ſubject may be ſeen in the third volume of Mémoires de l'Academie Royale de Chirurgie of Paris, by Monſieur Pipelet, in which ſeveral caſes are related of the bad effects produced by ligatures on the omentum.

Mr Pott is alſo of this opinion.—Vide Treatiſe on Ruptures.

cutting off part of the omentum, that a veſſel of any ſize is divided, a ligature may with ſafety be paſſed upon it with the tenaculum, without including any part of the membrane; and the ends of it being left to hang out at the wound, it may afterwards be pulled away at pleaſure.

Another circumſtance ſometimes occurs, that renders the removal of part of the omentum neceſſary: When a hernia has been of long duration, and a portion of omentum has been long down, from the preſſure made by the uſual ſuſpenſory bandage, the protruded parts are apt to become thickened, hard, and collected into lumps. When theſe lumps are not large, they need not be removed, and when ſmall, they may be returned into the abdomen without hazard; but whenever it appears, that by their bulk and hardneſs they might do miſchief if forced into the belly, they ought certainly to be cut off.

When we determine to remove any part of the omentum, the eaſieſt and ſafeſt method of doing it is this. The membrane

 ſhould

ſhould be carefully expanded at the part intended to be cut, in which ſtate it is eaſily divided with thin-edged ſciſſars, more ſo indeed than with any other inſtrument. When fully ſpread out, any turn of the inteſtine that may be enveloped in it, is at once brought to view, which, without this precaution, we would run the riſk of dividing with the ſciſſars.

When, again, a portion of gut is found to be mortified, if returned in this ſtate, a diſcharge of feces would certainly take place into the cavity of the abdomen, as ſoon as the mortified ſpot ſhould ſeparate from the ſound. For the prevention of this, which would ſoon terminate in the death of the patient, if a ſmall ſpot only is diſeaſed, we ſhould endeavour, with a needle and ligature, to connect the ſound part of the gut immediately above the mortified ſpot, to the wound in the abdominal muſcles. By this the feces are diſcharged by the wound, when the mortified ſpot either ſeparates or is cut out; and different inſtances have occurred, where

where the loſs of ſubſtance produced by the mortification was not extenſive, of the opening into the gut becoming gradually leſs, and at laſt healing entirely: But whether the event ſhould prove ſo fortunate or not, whenever a portion of gut is completely mortified, it ſhould be ſecured with a ligature to the contiguous parts.

And farther, when the mortification is extenſive, and includes, ſo far as it goes, the whole circumference of the gut, the gangrenous parts ſhould be cut out at once; and if the quantity thus taken away is not ſo conſiderable as to prevent the ends of the gut from being brought into contact, it ſhould be done immediately in the manner pointed out in Chapter III. Sect. XII. when treating of wounds of the Inteſtinal Canal: This at leaſt affords a chance of the ends of the gut being made to reunite; and if this unluckily ſhould not happen, a paſſage for the feces will ſtill be ſecured by the groin.

Although in this manner many have recovered who otherwiſe muſt have died; yet it muſt be admitted, that the riſk of patients in this ſituation is very conſiderable: But although a ſmall proportion only ſhould recover, ſtill practitioners would be to blame were they to omit thoſe means which afford the beſt chance to their patients. A patient of my own is now living, and in good health, voiding his feces by the anus, who loſt at leaſt one foot of the inteſtinal canal by mortification in a caſe of crural hernia; and we are told by different authors, of ſimilar recoveries equally remarkable.

It is to the moderns chiefly, I may remark, that we owe this important improvement in the treatment of hernia. It is even recorded of Rau, who lived in a very late period, that on opening a hernial ſac, where a gangrenous ſtate of the parts was diſcovered, as the caſe was ſuppoſed to be deſperate, he laid down his knife, and proceeded no farther in the operation. The patient, who died next day, would, in modern

modern practice, have had at leaſt ſome chance for life.

When it is therefore diſcovered, that mortification has taken place, all the diſeaſed parts ſhould be cut off, and the remaining ſound part of the gut being retained with the fingers till properly ſecured with a ligature, the opening in the external oblique muſcle may then be dilated with ſafety: Whereas, if it ſhould be enlarged before the diſeaſed part of the gut is taken away, the gangrenous portion might ſlip up together with the ſound; but by this precaution, every riſk of this kind is avoided.

The parts forming a hernia being all completely replaced, when the ſac in which they were contained is found to be hard, enlarged, and much thickened, as no advantage could be derived from preſerving it, ſuch parts of it as can be cut away with ſafety ſhould be removed: All the lateral and fore-parts of the ſac may be ſafely cut off; but being commonly firmly connected with the ſpermatic veſſels

 behind,

behind, this part of it ought not to be touched.

In common practice, the parts are now dreſſed with ſoft lint, and a ſuſpenſory bag employed for retaining it. But it anſwers better to draw the ſides of the cut previouſly together, including the ſkin, cellular ſubſtance, and anterior part of the hernial ſac, with a proper number of ſutures, by which the cure is much more quickly accompliſhed, at the ſame time that the parts are rendered more firm than they otherwiſe would be: At one time, this practice appeared to me to be hazardous; and I adviſed it not to be adopted, as in two inſtances a portion of gut got down between the ſutures, and one of the patients died before it was perceived: Farther experience, however, has made it obvious, that this may be always prevented, and that in various ways it proves uſeful: When the ſutures are not above half an inch from each other, and made to paſs to the bottom of the ſore, ſo as to include all the anterior part of the ſac, this

this accident can never happen. With a view to give a free vent to any matter that may form in the course of the cut, I have, in some instances, left an opening at the under part of it, but this precaution I now believe to be unnecessary: The sutures being completed, the parts should be all covered with a pledget of any emollient ointment, together with some plies of soft lint, and the whole retained by the T bandage.

The patient must now be carried to bed; and being so placed as to have his loins somewhat elevated above the rest of his body, he should in this situation be laid to rest: Opiates are here particularly useful: To prevent, or at least to moderate, the fever which commonly succeeds, the patient should be kept cool: In plethoric habits, blood-letting should be prescribed, together with a rigid low diet; and, lastly, if the belly is not naturally open, a frequent use of gentle laxatives is particularly proper.

When, however, the ſtrength has been previouſly much reduced, either by long ſickneſs or any other cauſe, inſtead of blood-letting and a low diet, a nouriſhing regimen becomes neceſſary; for if a patient in ſuch circumſtances is not properly ſupported, he will not ſo readily recover: It is alſo proper to remark, that, in common practice, the indiſcriminate uſe of blood-letting, and an abſtemious regimen, in every caſe of hernia, appears to be too rigidly adhered to; for, although it proves always uſeful in hernia, attended with inflammation, yet daily experience makes it obvious, that it proves hurtful where the ſyſtem has been already much reduced by evacuations, and where no inflammatory ſymptoms take place.

The ſore ſhould be looked at and dreſſed daily, by which means any change that may take place in it will be quickly diſcovered: The ligatures in the courſe of ſix or ſeven days ſhould be withdrawn, and as ſoon as the parts are firmly cicatrized, a well-adapted truſs ſhould be ap-

plied

plied to them, and never afterwards laid aside: Some indeed assert, that a truss after this operation is unnecessary, and where the cure has been accomplished with ligatures deeply placed, in the manner I have pointed out, it might in some instances be so complete, particularly during youth, as to prevent all future descents; but as the contrary has, in various instances, happened, the patient should be always put on his guard against it.

In performing this operation, it was proposed a considerable time ago by Mr Petit of Paris, and other French practitioners, to reduce the protruded parts, without dividing the sac: Since that period, the practice has been adopted by others. Dr Monro thinks favourably of it, and on his suggestion I have, in different cases, performed the operation in this manner. But, however unwilling I am to differ from such authority, I cannot in this instance avoid it: The chief reason assigned for not opening the sac, is, that we thereby prevent the air from finding

access

acceſs to the inteſtines; but although this would be highly deſirable, if the operation could otherwiſe be equally well performed, as it does not appear to me that this can be done, I think it right to obſerve, that the practice ſhould be received with caution, till, by further obſervation, it is aſcertained, whether it proves beneficial or not. The beſt mode of doing it would be for the ſurgeons of thoſe hoſpitals in which herniæ moſt frequently occur, to perform the operation a conſiderable number of times in each method, and to judge from the reſult, for we ſhould not decide upon a point of ſuch importance on the experience to be obtained from a few caſes.

The chief objection to the practice is, that unleſs the hernial ſac is laid open, we cannot poſſibly diſtinguiſh the ſtate in which the parts contained in it are; ſo that parts might be returned into the abdomen in ſuch a ſtate of diſeaſe as would add greatly to the hazard of the patient. The inteſtines are not only liable to mortify,

tify, but collections are sometimes found in the hernial sac, of a fetid putrid serum, which, on being pushed into the abdomen, might do much harm. And besides, it has sometimes happened, on laying open a hernial sac, that the cause of strangulation has been discovered, either in the sac itself, or among the parts contained in it: For although, in a great proportion of cases, a stricture of the passage through which the parts have come down, is to be considered as the cause of all the bad symptoms, yet instances of the contrary sometimes occur; one of which I met with some years ago, and I have heard of others of the same kind.—In a case of scrotal hernia of long duration, symptoms of strangulation at last supervened; and on laying open the sac, the appendix vermiformis was found so tightly twisted round a portion of gut, as left no reason to doubt of this alone being the cause of the mischief. If the parts had here been returned without dividing the sac, no advantage would have been derived from the operation;

operation; and, after death, the practitioner would have had the mortification to find, that the patient's life might have been ſaved, if this very neceſſary meaſure had not been omitted.

Inſtances of the protruded parts being returned into the abdomen without opening the ſac, are enumerated by different French practitioners; and in ſome which ended fatally, it was found on diſſection, that the ſtrangulation of the gut had been the effect of ſtricture formed by the parts contained within the ſac, and not by the tendon of the external oblique muſcles through which they had paſſed.

Diſaſters of a ſimilar nature having occurred to Mr Petit and others who had adopted the practice, it has long in France been very generally laid aſide; but in a point of ſuch importance, this will not be univerſally done till further experience ſhall evince whether it ought to be continued or not.

By ſome again, we are adviſed to reduce not only the protruded bowels, but even

even the hernial ſac itſelf; whilſt others allege, that the ſac can never be reduced. Mr Louis, in the paper I have quoted, is clearly of this laſt opinion, as Mr Pott alſo is. But we have the teſtimony of different authors of credit, and particularly of Mr Le Dran, to the contrary; and I have now met with it in more than one inſtance, where the appearances were ſo unequivocal as to leave no doubt with me reſpecting it.

In herniæ of long duration, where the parts have been long and repeatedly down, ſuch firm adheſions uſually form between the ſac and the contiguous parts, as to reduce them apparently into one inſeparable maſs; ſo that, in ſuch circumſtances, all attempts to reduce the ſac would be in vain. But although this would perhaps in every inſtance be the caſe in ruptures of long continuance, we are not warranted in ſuppoſing that it would be ſo in every caſe of recent hernia. We know that the adheſion of one part of the body to another, cannot any where be inſtantaneouſ-

ly

ly produced. Even where recent diviſion has taken place, and when the divided parts are kept in cloſe contact, the ſpace of ſome days is commonly required to produce a firm reunion. Now in the caſe of a portion of membrane being forced into a natural opening, where the parts are neither rendered raw by art, nor are as yet in a ſtate of inflammation, a ſtill longer period muſt be required for this effect; and in fact, although there is ſcarcely perhaps an inſtance of a hernial ſac of long duration being reduced, yet there are ſundry indiſputable facts which ſhow, that in recent ruptures it may be returned. In one of thoſe to which I allude, the gut had been down five or ſix days, and formed a tumor in the groin of the ſize of an egg: The ſac did not in any point ſeem to adhere; the operator therefore found no difficulty in reducing it; and on diſſection after death, which happened in two days from the operation, the paſſage through the external oblique muſcle was found dilated, but no exiſtence of a

ſac

ſac could be traced into it. This alſo was the caſe with the other, which had been down for twelve or thirteen days. It is not, however, my own opinion, that this is a matter of much practical importance, I mean the poſſibility of reducing the hernial ſac or not; for the reaſons I have enumerated againſt the return of a hernia without opening the ſac, occur with equal force againſt our returning the ſac itſelf unopened.

The obſervations that I have hitherto made relate chiefly to hernia in the male ſubject; but as the ſame openings in the external oblique muſcles exiſt in females, ſo they are alſo liable to the variety of rupture we have juſt been deſcribing.

In males, however, the bubonocele is more frequently met with than in women, and as in them too the cellular membrane ſurrounding the ſpermatic veſſels is very lax and dilatable, ſo hernial ſwellings of this part are commonly much larger in them than in women. But inſtances ſometimes occur, even in women, of the bubonocele

nocele being of great bulk: I have known the protruded parts fall down to the very bottom of the labia pudendi.

As the openings in the external oblique muſcles of females are exceedingly ſimilar to thoſe in the male, ſo the treatment, of bubonocele is in them very ſimilar to what is found to anſwer in men. When glyſters, blood-letting, and the other remedies enumerated above do not ſucceed, the ſame operation of laying open the hernial ſac, and enlarging the opening in the tendon of the oblique muſcle, is here equally proper as in the other ſex.

With modeſt women, herniæ often take place without the practitioner in attendance being made acquainted with them; whenever therefore ſuch ſymptoms of cholic occur in females as give reaſon to ſuſpect the exiſtence of hernia, a particular examination ſhould always be made, in order if poſſible to diſcover the cauſe of the miſchief, from the removal of which alone a cure can be obtained.

In

In this manner, I have, in different inſtances, ſaved the lives of patients, who otherwiſe in all probability would have died, without the cauſe of their diſeaſe being known: With ſome women this would happen from delicacy alone; but inſtances alſo occur, of herniæ ending fatally, where the tumors are ſo ſmall as ſcarcely to attract attention even from the patient.

SECTION III.

Of the Hernia Congenita.

FROM the anatomical deſcription given in the firſt ſection of this chapter, of the parts chiefly concerned in hernia, it appears, that in the common hernia of the ſcrotum, the parts protruded from the abdomen muſt neceſſarily be contained in a bag or ſac perfectly diſtinct from the teſtis: In that kind of rupture, the teſtis therefore remains in its uſual ſituation, ſurrounded by its own proper membrane the tunica vaginalis, and not in contact with any other part.

But from the ſame deſcription it appears, that if in early infancy a portion of gut ſhould ſlip down by the ſame paſſage with the teſticle, that the parts ſo protruded muſt be in immediate contact

with

with the teſtis, and muſt thus be contained in the tunica vaginalis; ſo that in this rupture, very properly by Haller termed Hernia Congenita, the tunica vaginalis teſtis forms the hernial ſac.

The diſcovery of this variety of hernia, which was reſerved for modern times, enables us to account for a number of caſes recorded in books of ſurgery, of the contents of ruptures being found in the ſame bag with the teſticle; a circumſtance which, till this diſcovery, was conſidered as a clear proof of the peritonæum being frequently ruptured in hernia, as till of late this phenomenon could not otherwiſe be explained. But we now know, that the peritonæum is never ruptured in hernia; and that the parts forming a hernial tumor being found in contact with the teſticle, is a circumſtance eaſily explained from the more accurate knowledge we have obtained of theſe parts.

The treatment of the congenital hernia ſhould be nearly the ſame with that of bubonocele in its more ordinary form.

When the parts can be replaced without an operation, it ought always to be done, a truſs being at the ſame time recommended as a preventive of future deſcents; and when ſymptoms of ſtrangulation take place, which cannot be otherwiſe removed than by the operation, it here becomes equally proper as in the common form of the diſeaſe.

When from a hernia having taken place in early infancy, and from the parts having continued to fall into the ſcrotum occaſionally from that period downwards, there is reaſon to ſuſpect that a rupture in which ſtrangulation has taken place is of the congenital kind, the ſurgeon, in dividing the ſac, ſhould proceed with ſtill more caution than in common hernia; for the tunica vaginalis which here forms the ſac, is commonly much thinner than the uſual ſac of a hernia. On the parts being returned, more attention is alſo neceſſary in dreſſing the wound than in other caſes of rupture; for the teſticle being here laid bare by the vaginal coat being cut open,

open, if not treated with much delicacy it might probably inflame, and be thereby the cause of much additional distress and danger. The testis therefore should be immediately enveloped with its own proper covering, the loose tunica vaginalis; and every dressing should be so conducted as to prevent with as much certainty as possible the external air from finding access.

In other circumstances the management of the hernia congenita is the same with that of any other rupture.

SECTION IV.

Of the Crural or Femoral Hernia.

THE ſeat of the crural hernia, as I have remarked above, is on the upper and anterior part of the thigh; the protruded parts paſſing out at the ſame opening through which the large blood-veſſels of the thigh are tranſmitted from the abdomen.

In the deſcription given in the firſt ſection of this Chapter, of the external oblique muſcles of the abdomen, I remarked, that the under edge of theſe muſcles, by doubling backwards, aſſumes the appearance of a ligament, extending in an oblique direction from the ſpine of the ileum near to the ſymphyſis pubis, and forming what is commonly termed the ligament of Poupart or Fallopius.

Excepting

Excepting at its two extremities, where this ligament is attached to the pubes and ileum, it is not in any other part connected with bone. By the particular shape of the ileum at this part, a kind of arch is formed, by the ligament passing over a hollow in that bone, through which the large artery and veins of the thigh find a passage, the rest of the cavity being filled up with cellular substance, glands, and fat; and all these parts again are covered with and tied down by a firm tendinous aponeurosis of the fascia lata of the thigh.

It is under the tendon or ligament just now described, that the parts composing a crural hernia descend. In some instances they pass immediately over the femoral artery and vein; in others, they are found on the outside of these vessels; but more frequently they lie on the inside, between them and the os pubis.

As the protrusion and strangulation of any of the contents of the abdomen, excites nearly the same symptoms, where-

 ever

ever this diſeaſe takes place; ſo the ſymptoms of crural hernia are ſo ſimilar to thoſe deſcribed in the two firſt ſections of this Chapter, that is is not neceſſary to mention them here.

The cure of the femoral hernia is alſo conducted upon the ſame principles with that of bubonocele, deſcribed in the ſecond ſection; ſo that when ſymptoms of ſtrangulation take place in it, the ſame remedies ſhould be employed that were adviſed above for bubonocele. Only here, in attempting to reduce the parts by the hand, the preſſure ſhould be made directly upwards, inſtead of obliquely outwards, as was adviſed in the other; and when theſe means do not ſucceed, the operation itſelf muſt be employed.

In deſcribing the operation for the inguinal hernia, I adviſed the external inciſion to be free and extenſive. It is ſtill more neceſſary in the crural hernia, from the parts concerned in it being more deeply ſeated. By timidity in making the firſt inciſion, the operator is frequently much incommoded

incommoded in all the ſubſequent parts of the operation. The external cut ſhould extend at leaſt from an inch above the upper end of the tumor to the ſame length below the moſt depending part of it.

The membrana adipoſa, tendinous expanſion of the faſcia lata, and hernial ſac, being all divided, if the protruded parts are found in a fit ſtate for reduction, we ſhould immediately attempt to replace them; and as the ſpace below the ligament through which they have paſſed is conſiderable, this may commonly be done without dividing it, merely by preſſure properly applied with the fingers, while the patient is placed in the poſture directed above for the operation of the bubonocele as being beſt ſuited for favouring a return of the bowels.

When the contents of the tumor can be reduced without dividing the ligament, the patient is thereby ſaved from a good deal of hazard, as from the ſituation of the ſpermatic veſſels and epigaſtric artery with

with reſpect to this ligament, any cut made into it is done with the riſk of theſe veſſels being injured.

The ſpermatic veſſels in paſſing along towards the opening in the external oblique muſcle, run nearly upon the very edge or border of Poupart's ligament, ſo that I conſider it as impoſſible to make a free diviſion of the ligament without cutting them acroſs.

We have been adviſed indeed by ſome, in order to avoid the ſpermatic veſſels, which they allow would be wounded, if the inciſion ſhould be carried directly upwards, to cut in an oblique direction outwards. They admit, that in this way the epigaſtric artery may probably be divided; but the riſk attending the diviſion of that artery they do not conſider as of much importance; and if the diſcharge of blood which it might produce ſhould happen to be conſiderable, they ſpeak of it as an eaſy matter to take it up with a ligature; for which purpoſe needles

needles of various ſhapes have been invented. Even in emaciated people, however, it is difficult to reach the epigaſtric artery with a ligature, and in corpulent patients it muſt often be impoſſible; ſo that the younger part of the profeſſion ſhould be cautious in receiving the directions uſually given on this point. On reading the remarks of the late Mr Sharpe on it *, to ſecure the epigaſtric artery with a ligature, one would expect to be the eaſieſt of all operations; but the difficulty which attends it, is ſuch, as muſt convince all who have tried it, that Mr Sharpe himſelf never put it in practice.

But even although the epigaſtric artery could with certainty be avoided, if a hernia is large, the ligament is ſo much ſtretched as to bring the ſpermatic veſſels ſo nearly on a line with the under edge of it, as to render it altogether impoſſible to divide the one without the other; and whoever will examine theſe parts in this ſituation,

* Critical Inquiry into the preſent ſtate of Surgery.

ſituation, will ſee that this cannot be avoided, whether the inciſion is carried directly upwards, or obliquely outwards or inwards.

Some who have been ſenſible of the danger attending this part of the operation, have propoſed merely to dilate the paſſage inſtead of dividing the ligament; and Mr Arnaud, a French author, delineates a curved levator for the purpoſe of ſupporting the ligament till the protruded parts are reduced: but as we are to ſuppoſe in every caſe of ſtrangulated hernia, that the paſſage through which the parts have fallen down is already dilated to nearly its utmoſt poſſible extent, in ſuch a ſituation to attempt a farther dilatation, without the aſſiſtance of the knife, would ſeldom, it is probable, anſwer any good purpoſe.

A conſiderable time ago it occurred to me, that in this part of the operation ſome aſſiſtance might be derived from performing it in the following manner; and having ſince had occaſion to put it in

in practice with ſucceſs, I can now with ſome confidence recommend it. Inſtead of dividing the ligament in the ordinary way, from below upwards, I make a ſlight inciſion into it, about an inch in length, beginning above and proceeding to the under edge of it.

The firſt ſcratch with the ſcalpel ſhould be ſlight; but by repeated touches, it ſhould be made to penetrate almoſt through the whole thickneſs of the ligament, till at laſt only a thin layer of it remains: In this ſituation the protruded parts may for the moſt part be returned with eaſe, as the ligament where thus weakened by the inciſion will yield gradually to the preſſure applied for the reduction of the inteſtines.

As in this manner the opening may be enlarged to any neceſſary extent, and as the ſpermatic veſſels and epigaſtric artery are thus avoided, the operation may not only be done with equal certainty, but with the ſame ſafety, as for any other rupture. For, by not penetrating with the

the ſcalpel through the whole thickneſs of the ligament under which theſe blood-veſſels lie, they are thereby kept free from danger during this part of the operation; and the preſſure afterwards uſed for the reduction of the protruded parts, if done in a gradual manner, can never injure them materially, as bloodveſſels of the ſize and ſtrength of theſe eaſily admit of much more extenſion than is here required.

In every other circumſtance, the crural hernia, as I have obſerved already, requires the ſame method of treatment with bubonocele, for which the ſecond ſection of this Chapter may be conſulted: Only I may remark, that the dreſſings are more eaſily retained after this operation, by a piece of leather ſpread with plaſter moderately adheſive, than with any kind of bandage.

I have already obſerved, that the crural hernia is more frequent in women than in men, owing to the particular con-

formation

formation of the parts in which it occurs. In women the ſame mode of operating ſhould be obſerved as in men; for as in them there is the ſame riſk of wounding the epigaſtric artery, the ſame precautions are neceſſary for avoiding it, and by attending to the directions given above, it may be always done.

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SECTION V.

Of the Exomphalos, or Umbilical Rupture.

IN this variety of hernia, the parts protruded from the abdomen paſs out at the umbilicus; and the contents of the hernial ſac are here, as in every other rupture, exceedingly various. In ſome inſtances they conſiſt of inteſtines only; ſometimes of omentum only; and frequently of both. In ſome, part of the ſtomach, liver, and ſpleen, have been found in the ſac of an umbilical rupture.

As all theſe parts are naturally contained in the peritonæum, the hernial ſac, it is evident, muſt here as in other ruptures be formed by that membrane being carried along with ſuch parts as are protruded. Accordingly, in every recent inſtance of umbilical hernia, this ſac is in

in general evident; but when the tumor is large, the ſac becomes ſo intimately connected with the contiguous parts, in conſequence of the weight and preſſure of its contents, that many have doubted whether this ſpecies of hernia has a ſac or not. In ſome inſtances the tumor has increaſed to ſuch a degree, as actually to burſt the ſurrounding parts; not only the ſac, and cellular ſubſtance, but even the ſkin itſelf.

Umbilical herniæ occur moſt frequently in early infancy, and in corpulent people more frequently than in others, from this obvious reaſon, that by the great bulk of parts contained in the abdomen of fat people, the ſurrounding muſcles are kept conſtantly diſtended, by which the opening at the umbilicus, through which the parts are protruded, is made more pervious: For a ſimilar reaſon, women in the laſt months of pregnancy are particularly liable to this rupture.

If attended to in due time, a right bandage will commonly effect a cure;

and, when produced by pregnancy, a temporary removal of the diſeaſe, is, in general, a certain conſequence of delivery. While a woman continues pregnant, we can ſeldom remove an umbilical rupture, but by employing a bandage early we can in this ſituation prevent the tumor from becoming larger.

Although different portions of the alimentary canal are occaſionally met with in umbilical ruptures; yet by experience we know, that moſt frequently they contain omentum only: hence umbilical herniæ are not in general ſo hazardous as other ruptures.

It happens, however, as I have obſerved above, that in ſome caſes a portion of gut alone is puſhed out, by which the uſual ſymptoms of ſtrangulation are apt to be induced. In this ſituation, when the means uſually employed for returning the gut do not ſucceed, as a ſtricture of the paſſage through which it has fallen, is to be conſidered as the ſole cauſe of the danger; ſo a cure, it is evident, muſt depend

depend entirely on this being removed. In performing this operation, a free external incision along the course of the tumor is the first step to be taken; and on laying the protruded parts bare by a cautious division of the sac, if they are found in a state fit to be returned, and if this cannot be effected but by enlarging the passage into the abdomen, it may be done with safety by introducing the finger, and enlarging the opening with a blunt-pointed bistoury. This incision, I may remark, may be made with almost equal safety in any direction; but lest the ligament formed by the umbilical vessels should be wounded, which, however, would not probably do much harm, yet when an operator is of a different opinion, it may always be avoided by making the cut on the left side of the umbilicus, and carrying it a little obliquely upwards and outwards.

When, again, the prolapsed parts, on being laid open, are found to be so much diseased as to render their reduction im-

proper, the directions formerly given for ſimilar occurrences in other caſes of hernia, will apply with equal propriety here, and need not now be repeated.

By Albucaſis, Guido, Aquapendens, and others, it has been propoſed, with a view to obtain a radical cure without the operation, to lift up the ſkin covering the tumor, with the finger and thumb, ſo as to ſeparate it from the gut beneath ; and a cord being paſſed round the parts thus raiſed up, a ligature to be made ſo tight as to induce mortification over the whole of them.

In other inſtances again, when the form of the ſwelling did not admit of this, the ſame precaution being taken for avoiding the gut, a needle containing a double ligature was introduced through the baſis of the tumor, near to its centre, and the ligatures afterwards tied one above and the other below, of ſuch tightneſs as to induce the wiſhed-for effect.

But as the practice thus recommended did not anſwer the purpoſe, for it did not prevent a return of the diſeaſe, and as the deſtruction

deſtruction of ſkin rendered every future deſcent more dangerous, ſo it is now, at leaſt by regular practitioners, very univerſally exploded.

In Plate LXV. fig. 3. is repreſented the beſt bandage I have uſed for umbilical herniæ.

SECTION VI.

Of Ventral Herniæ.

IN ventral hernia the parts forming the tumor are protruded between the interſtices of the abdominal muſcles. No part of the abdomen is altogether exempted from theſe tumors, but they are moſt frequent in the parts moſt contiguous to the linea alba; and when the ſtomach alone forms the tumor, the ſwelling is ſituated juſt under, or immediately to one ſide of the xiphoid cartilage.

The treatment of this rupture correſponds with that of exomphalos. When the parts are reducible by the hand alone, a cure may be frequently obtained by the conſtant uſe of a truſs; and, again, when ſymptoms of ſtrangulation occur, which cannot be removed but by an inciſion through the ſtricture, this muſt be done

in the manner pointed out in the laſt ſection, ſo as to admit of the parts being replaçed. The after-treatment of the parts concerned in the operation, is the ſame here as in the umbilical rupture.

SECTION VII.

Of the Hernia of the Foramen Ovale.

IN this rupture, the viſcera protrude through the foramen ovale of the pubis and iſchium. It is not a frequent variety of the diſeaſe; but as it has been met with, it is neceſſary to deſcribe it.

The ſymptoms of this hernia being very ſimilar to thoſe ariſing from ſtrangulated inteſtines in other parts, they need not be enumerated here: Only it is proper to remark, that in this rupture the tumor is in men formed near to the upper part of the perinæum; and in women, near to the under part of one of the labia pudendi. In both ſexes it lies upon the obturator externus, between the pectineus muſcle and the firſt head of the triceps femoris.

The

The foramen ovale being partly filled up by a membranous or ligamentous ſubſtance, and in part by the obturatores muſcles, it was commonly ſuppoſed that this ſpecies of hernia aroſe from a relaxation of one or other of theſe; but as an opening is left in the foramen for the tranſmiſſion of different bloodveſſels and nerves, it is now known, that in this rupture the viſcera paſs out at that opening, by gliding down in the courſe of theſe veſſels.

The general mode of treatment pointed out in the preceding ſections for other herniæ, muſt be here kept in view; and when the parts are reduced, a truſs properly adapted to the parts, muſt be truſted to for retaining them. But, as it will ſometimes happen in this, as in every other hernia, that the parts cannot be reduced with the hand alone, when this is found to be the caſe, it muſt be done by dilating the paſſage through which they protrude. The tumor, however, that takes place here, being in general ſo ſmall as ſcarcely

ſcarcely to be noticed but by the moſt minute attention, unleſs a local pain, with the uſual ſymptoms of a ſtrangulated gut happen to lead to it, it is ſeldom diſcovered from its ſize, till it is too late to expect much aſſiſtance from art.

But, whenever the operation becomes neceſſary, as it muſt always be when ſymptoms of ſtrangulation ariſe from a portion of protruded gut that cannot by any other means be reduced, after carefully laying the prolapſed parts bare, if they cannot be reduced but by dilating the paſſage, and as death muſt enſue if reduction cannot be accompliſhed, it ought undoubtedly to be attempted: But as it is almoſt impoſſible to enlarge this opening with an inſtrument, without dividing ſome of the bloodveſſels that paſs out at the foramen; and as this would probably end in the death of the patient, the depth and ſituation of the parts rendering the application of a ligature impracticable; it is more adviſable, by means of a flat hook, to dilate the paſſage to a ſufficient ſize,

by

by gentle gradual ſtretching. By inſinuating the end of the hook between the inteſtine and ligament, and pulling it gradually upwards, a degree of dilatation may be obtained, ſufficient for the reduction of the gut, without incurring that hazard which the diviſion of the ligament with the knife or any ſharp inſtrument muſt always occaſion. A hook for this purpoſe is delineated in Plate LXXVIII. fig. 2.

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SECTION VIII.

Of the Hernia Cyſtica, or Hernia of the Urinary Bladder.

IN this rupture, the urinary bladder is the organ protruded; and the ſituations in which it occurs, are either the groin and ſcrotum through the opening in the external oblique muſcle of the abdomen; the fore-part of the thigh under Poupart's ligament; or the perinæum through ſome of the muſcular interſtices of that part *. Inſtances have likewiſe happened, of the bladder being puſhed into the vagina, ſo as to form hernial tumors of conſiderable bulk.

As only a part of the bladder is covered with the peritonæum; and as the bladder,

* An inſtance of this is recorded in vol. IV. of Mémoires de l'Academie Royale de Chirurgie, by Monſ. Pipelet le Jeune, p. 181.

der, in order to get into the opening in the external oblique muſcle, or under the ligament of Fallopius, muſt inſinuate itſelf between that membrane and the abdominal muſcles, it is evident, that the hernia cyſtica cannot be covered with a ſac, as inteſtinal ruptures uſually are. In the perinæum, again, that portion of the bladder moſt liable to fall into it, is in no way connected with the peritonæum.

In ſome inſtances, this rupture occurs by itſelf, without any complication; and in others it is accompanied with inteſtines and omentum, both in inguinal and femoral herniæ: When complicated with a bubonocele, the protruded portion of the bladder lies between the hernial ſac and ſpermatic cord; that is, the inteſtinal hernia lies anterior to it.

The uſual ſymptoms of this hernia are, A tumor, attended with fluctuation, either in the groin, in the fore-part of the thigh, or perinæum, which gradually ſubſides when the patient voids urine, and becomes

comes larger when the bladder is full. When the tumor is large, before water can be paſſed with freedom, it is commonly neceſſary to employ preſſure, at the ſame time that, when in the groin or thigh, the parts require to be as much elevated as poſſible; but when the tumor is ſmall, and eſpecially when no ſtricture has taken place, the patient generally voids urine eaſily, and without aſſiſtance from external preſſure.

When a hernia of the bladder takes place without any complication, it commonly proceeds from a ſuppreſſion of urine. In the method of cure, therefore, every cauſe of ſuppreſſion ſhould, as far as poſſible, be guarded againſt; and if the protruded portion of bladder can be reduced, a truſs properly fitted to the part, ſhould be worn for a conſiderable time. But when the parts cannot be reduced, as long as no ſymptoms appear to render the operation neceſſary, a ſuſpenſory bag, ſo fitted as effectually to ſupport the tumor without compreſſing it, is

is perhaps the only remedy we ſhould employ.

When, again, a portion of bladder protrudes into the vagina, after reducing the parts, which we do by laying the patient on her back, with her loins elevated, and preſſing with the fingers from the vagina, deſcents in future may, in general, be prevented by the uſe of the peſſary repreſented in Plate LXXIV. fig. 2. And the ſame means, I may remark, are employed with ſucceſs, in preventing deſcents of the inteſtinal canal into the vagina; a ſpecies of rupture ſometimes met with.

It may happen, however, if inflammation occurs here, that the diviſion of the parts producing the ſtricture will be as neceſſary as in any other rupture. In which event, the mode of operating pointed out in the preceding ſections ſhould be kept in view.—Only it muſt be remembered, that as in the hernia cyſtica without any complication, the protruded parts are not covered with a ſac, ſo ſtill more caution

caution is required in laying them bare, than is neceſſary in common ruptures.

It ſometimes happens, that ſtones are produced in the protruded portion of the bladder. In which event, if it ſhould ever be neceſſary to cut into them, if the bladder can be eaſily retained in its prolapſed ſtate till the wound is healed, it ought always to be done, in order to prevent that internal extravaſation of urine which otherwiſe would occur, and which certainly would do harm. The ſame precaution is neceſſary, when by accident in the operation for the hernia cyſtica, the bladder is opened; or when any part of it is in a ſtate of mortification, and therefore unfit to be returned into the abdomen *.

* The beſt accounts of all the varieties of hernia are to be met with in the works of Le Dran, Heiſter, and of Mauchart, in a Treatiſe de Hernia Incarcerata; in the different volumes of Mémoires de l'Academie Royale de Chirurgie de Paris; in the Medical Eſſays of Edinburgh; in the works of the late Dr Monro; in Haller de Hernia Congenita,

Congenita, in his Opuſcula Pathologica; in Mr John Hunter's very accurate account of the ſtate of the teſtis in the fœtus, to be met with in Dr Hunter's Medical Commentaries; in Mr Pott's and Dr Richter's valuable works on this ſubject. Theſe are the beſt modern authors on this ſubject; and very little ſatisfaction is to be obtained from any of the ancient writers upon it.

CHAPTER XXIV.

On the HYDROCELE.

SECTION I.

General Remarks on the Hydrocele.

EVERY tumor formed by a collection of water, may, from the import of the word, be called a hydrocele, but, in chirurgical language, the term implies a watery ſwelling in the ſcrotum or ſpermatic cord.

This, as well as all tumors in the ſcrotum or groin, not immediately produced by

by the protrusion of parts from the abdomen, were, by ancient writers, termed false or spurious herniæ, from the resemblance which they bear to the true hernia, or rupture; but no advantage is derived from this distinction: And, as it arose from an erronæous opinion of the origin of herniæ, I should not have taken notice of it here, but with the view of making the writings of the ancients upon this subject intelligible.

Indeed, the doctrines of the writers of the last and preceding centuries, concerning hydrocele, are so confused and perplexed, that they do not merit attention; for, as they were ignorant of the anatomy of the parts in which the disease is seated, the ideas which they formed of it, gave rise both to an erroneous pathology and pernicious practice. Not being acquainted with the structure of the parts affected, they proceeded with much unnecessary dread in the teatment of the diseases to which they were liable; for, by supposing an immediate connection to subsist be-

tween the coats of the teſticle, the cavity of the abdomen, liver, kidneys, and other viſcera, they were induced to conſider the collection of water in hydrocele, as a depoſition from theſe parts, and as tending to free them, and perhaps the ſyſtem at large, from diſeaſes of importance.

In conſequence of this, their practice was timid and indeciſive; ſo that every chirurgical operation, in which theſe parts were concerned, became a matter of much importance to reſolve upon, and very tedious, painful, and uncertain in the execution.

From the time of Celſus to the middle of the laſt century, little progreſs ſeems to have been made in this part of chirurgical pathology. Indeed, from Celſus downwards, authors ſeem to have copied almoſt exactly from one another, till Wiſeman, Le Dran, Garangeot, and Heiſter, gradually elucidated the ſubject: but it was not clearly underſtood till the diſcoveries of Monro, Haller, Hunter and Pott, made the anatomy of the parts plain

and

and intelligible. So much attention, however, is ſtill given to the confuſed accounts of ancient writers, that the real nature of the diſeaſes of the teſtes, and their appendages, is, from this cauſe alone, leſs underſtood than it otherwiſe would be. There is perhaps no part indeed of ſurgery with which ſtudents in general are ſo little acquainted.

Nothing but a ſtrict attention to the diſcoveries of late anatomiſts, can convey clear and diſtinct ideas concerning them; and, whoever will make himſelf acquainted with theſe, will find, that the hydrocele and affections of the teſtes, may be explained with as much clearneſs and ſimplicity as any other claſs of diſeaſes. In the firſt Section of Chapter XXIII. I gave a deſcription of theſe parts, in ſo far as was neceſſary for the conſideration of hernia. Referring to what I had then occaſion to ſay, commencing in page 254, and ending page 266, I have now only to add what may be neceſſary for underſtand-

ing more completely the diſeaſes of the teſtes, and their tunics.

As from the foreſaid deſcription it appears, that the teſtis while in the abdomen is firmly attached to the peritonæum behind, ſo, when in the ſcrotum, as the vaginal coat with which it is there ſurrounded, is evidently a continuation of the peritonæum, it muſt of neceſſity be ſtill connected with that membrane, in the ſame manner as while it remained in the abdomen. And accordingly we find, that, although the teſticle lies looſe in this ſac, or vaginal coat, in every other part; yet, along its poſterior part, it is firmly attached to it. At this part, the different veſſels of the teſtis ſtill enter; and at this the peritonæum, or what is now the tunica vaginalis, is reflected over it, and every where cloſely attached to it, thereby forming the tunica albuginea, or immediate covering of the teſticle; ſo that the tunica albuginea is demonſtrably a mere continuation of the other, or vaginal coat.

The

The inferior part of this procefs of the peritonæum being fomewhat wider below than above, leaves the tunica vaginalis of a pyramidal form; and it is alfo fomewhat longer than the teftis, reaching from the fuperior part of the epididymis, where it begins, to a little below the inferior point of the tefticle, where it terminates. It is altogether of fuch a fize as to allow the teftis to roll eafily within it; its principal ufe appearing to be, to retain a fmall quantity of a fine exhalation, which is conftantly fecreting, either from its own furface, or from the furface of the teftis itfelf, for the purpofe of keeping the latter moift and eafy.

The vaginal coat, of which I have thus given a defcription, is the only loofe covering belonging either to the fpermatic cord or teftis: For although, by many, a vaginal coat of the fpermatic cord is alfo defcribed, together with a fuppofed feptum between it and the vaginal coat of the teftis, yet no fuch covering is, on diffection, found to exift. The upper part

of what may be called the ſpermatic proceſs of the peritonæum, is evidently cloſed, as has been deſcribed above, ſoon after the deſcent of the teſticle; and a firm adheſion taking place between the cord and that part of the ſac with which it is enveloped, no veſtige can be traced, either of a vaginal coat of the ſpermatic cord, or of any particular ſeptum between this coat and the teſticle: This, it is of importance to notice, as the diſeaſes of theſe parts cannot otherwiſe be underſtood.

As the diſeaſes we are now to conſider are chiefly ſeated in the coverings of the teſtis, I have given a more particular account of them, than is neceſſary in ſpeaking of the teſtis itſelf; with reſpect to which, I ſhall only obſerve, that it is evidently very vaſcular, being compoſed almoſt entirely of different convolutions of veſſels.

Beſides the vaginal coat proper to each teſticle, the two teſtes have for their further protection, a more external covering, the

the scrotum; a bag formed almost entirely of skin and cellular substance; for that body, the dartos, which has been commonly described as muscular, is now clearly proved to be altogether cellular. Even the septum scroti, or that membrane which divides one testicle from another, is composed of cellular substance in a more condensed state. By air it is easily inflated, and it is also pervious to water; so, of course, it partakes of all those watery effusions, to which the more external parts of the scrotum are liable.

This structure of the scrotum it is necessary to be acquainted with, as, from the descriptions which, till of late, have been given of it, young practitioners are induced to consider it as muscular, and to suppose that the septum, with its rapha, are ligamentous; and hence they are led to be more cautious than they need be in performing operations on this part.

Having thus premised an account of the anatomy of the parts in which the water in hydrocele is collected, I shall

now

now proceed to conſider the different varieties of the diſeaſe.

All the varieties of hydrocele which have been mentioned by authors, may, I think, be comprehended under the two following, the Anaſarcous, and Encyſted.

In the former, the ſerum is diffuſed over all the ſubſtance of the part in which it is ſeated; it is not collected in any particular cavity, but occupies equally all the cells of the part: In that which I term encyſted, the water is collected in one diſtinct bag, and a fluctuation of a fluid is, in general, perceived in it. The ſcrotum, with its contents, the teſticle and its appendages, are liable to both varieties of the diſeaſe; and the ſpermatic cord, with its coverings, are alſo liable to both. We ſhall firſt conſider thoſe of the ſcrotum.

SECTION II.

Of the Anaſarcous Hydrocele of the Scrotum.

THE ſcrotum, from its cellular ſtructure, and immediate connection with the trunk of the body, is apt to partake of every diffuſable ſwelling with which the upper part of the body is attacked: And, accordingly, we find, that general anaſarcous ſwellings ſeldom ſubſiſt for any length of time, without affecting the ſcrotum. A local anaſarca of the ſcrotum, is ſometimes indeed produced by a local cauſe, to wit, by the preſſure of a tumor on the lymphatics of the part; by external injuries; and occaſionally by an effuſion of urine from a rupture of the urethra: But ſuch occurrences are rare; a general diſeaſe of the conſtitution being the uſual forerunner of theſe tumors.

As

As ſoon as water has collected in any conſiderable quantity in the ſcrotum, a ſoft, inelaſtic, colourleſs tumor is obſerved over the whole of it; impreſſions are eaſily received and retained for ſome time; the ſkin at firſt preſerves its natural appearance; and the rugæ of the ſcrotum, which, in a ſtate of health, are obvious, are not for ſome time much altered; but as the ſwelling advances, the rugæ gradually diſappear, till at laſt they are totally obliterated: The tumor, from being at firſt ſoft, and of a conſiſtence ſimilar to dough, by degrees turns more firm, and the ſkin at laſt acquires an unnatural white ſhining appearance. At length it becomes large; and although originally confined to the ſcrotum, it at laſt ſpreads up the groin: The penis likewiſe becomes affected, and often ſo ſwelled and diſtorted, as to excite much inconvenience and diſtreſs; and although the ſcrotum is compoſed of parts which readily admit of dilatation, yet, in ſome inſtances, the tumor becomes ſo enormous,

mous, as to burst from one end to the other.

These appearances of the disease are so characteristic, as to render it almost impossible to confound this species of hydrocele with any other tumor of the scrotum.

I have already observed, that instances sometimes occur, of the scrotal anasarca being produced by a local cause; but, in a great proportion of cases, it is induced by a general tendency to dropsy; so that the cure will chiefly depend upon the removal of that habit of body, by which it was at first produced.

The treatment of this disease of the system falls to the province of the physician, so that I shall not enter upon it at present; but the aid of surgery is frequently required, for relieving the distress which these tumors always induce when they become large. In these circumstances, the object of surgery is, by drawing off the water, to diminish the size of the tumor, or even to remove it altogether,

altogether, which not only gives much immediate relief, but is a means of the diſtended parts recovering their tone more readily than they otherwiſe would do. Different methods have been propoſed for evacuating the water; the introduction of a ſeton, paſſing a trocar, inciſions, and punctures.

All of theſe, excepting that by the trocar, ſerve very effectually to evacuate the diffuſed water; and therefore we are to adopt that which not only excites leaſt pain, but which is leaſt liable to produce troubleſome conſequences; and this unqueſtionably is the method by punctures.

The ſeton and long ſcarifications may diſcharge the water more quickly than punctures; but in dropſical conſtitutions, ſuch as the anaſarcous hydrocele is commonly connected with, they almoſt conſtantly do harm. For the firſt two or three days, ſcarifications give the patient much ſatisfaction: the water is almoſt entirely diſcharged, the tumor is of courſe greatly diminiſhed, and much relief is thereby

thereby obtained. About this time, however, the ſcarified parts commonly begin to fret, their edges turn hard and inflamed, and by degrees, an eryſipelatous redneſs ſpreads over the neighbouring parts.

That fretful uneaſineſs at firſt complained of, terminates at laſt in what the patient terms a burning kind of pain, which frequently becomes ſo tormenting, as entirely to deſtroy reſt; and it too commonly happens, that all our remedies fail in preventing the acceſſion of gangrene, by which the patient is in general carried off.

I will not ſay that ſcarifications always end in this fatal way; but I have in many inſtances found that they did ſo; and, on the contrary, although punctures ſometimes terminate in the ſame manner, they are by no means ſo ready to do ſo.

As ſcarifications are ſo apt to do harm, there is much reaſon to ſuſpect that the trocar and ſeton, which both excite ſtill more irritation, would prove ſtill more hurtful.

hurtful. They are now, accordingly, in the anafarcous hydrocele very generally laid afide.

When fcarifications are to be employed, we make them with the fhoulder of a lancet: they fhould penetrate the cutis vera, but fhould not be carried to a greater depth, and they fhould not exceed an inch in length: punctures fhould be carried to the fame depth; and they, as well as fcarifications, fhould be always on the moft prominent and moft depending parts of the tumor: Punctures are beft made with the point of a lancet: five or fix are commonly fufficient at once; but as they are apt to heal before the ferum is all difcharged, they require from time to time to be renewed.

Preferving the parts dry, by a frequent renewal of dry linen cloths, in order to imbibe the moifture, is here a very neceffary attention; indeed, the want of it feems often to be the caufe of much of the mifchief that enfues from this operation.

When

When either ſcarifications or punctures go wrong, by beginning to inflame and turn painful, inſtead of the warm emollient poultices and fomentations uſually employed, a cold ſaturnine ſolution applied upon ſoft linen, not only proves more effectual in putting a ſtop to the inflammation, but affords more immediate relief to the preſent diſtreſs. Lime water, employed in the ſame manner, proves alſo an uſeful application.

Mortification, however, will take place in ſome inſtances, notwithſtanding all that we can do to prevent it: In this caſe, we truſt chiefly to the internal uſe of bark, wine, and other tonics, and to warm dreſſings and other external applications uſually employed in gangrene: As this variety of gangrene is almoſt always accompanied with much irritation, I often give opium with advantage: Opium proves chiefly uſeful, by removing pain and general irritability; but as we know from experiment, that it acts as an antiſeptic, it may in ſome caſes ſtop the progreſs of

 gangrene,

gangrene, by acting directly on the diseased parts.

In a great proportion of cases, the utmost danger is to be dreaded from the punctured parts being attacked with gangrene; yet, in a few instances, very unexpected cures are obtained, after all the teguments have been destroyed by it. A remarkable instance of this occurred some years ago, in the Royal Infirmary here: The whole scrotum separated, and left the testicles bare. During the time that the sore remained open, all the water collected in other parts of the body was evacuated, and, by the use of large quantities of bark, and mild dressings to the sore, the patient got well. In the course of the cure, the testes became enveloped with a thick cellular substance, which served as a very good means of protection. It must have been some similar production, I suppose, which Hildanus speaks of as a regenerated scrotum *.

I

* Observat. Chirurg. Cent. 5. Obs. 76.

I have already obſerved, that, although the anaſarcous hydrocele depends, for the moſt part, on a general tendency to dropſy, that ſome inſtances, however, occur, of a local cauſe producing a mere local dropſy of the ſcrotum. Thus it has, in ſome inſtances, ariſen from tumors in the groin and abdomen obſtructing the paſſage of the lymphatics. In this caſe, if the tumors producing the obſtruction can be extirpated, no other means will afford ſuch effectual relief; but, when ſo deeply ſeated as to render any attempt for removing them unſafe, the practice I have pointed out, of making punctures in the moſt depending part of the tumor, muſt be employed, from time to time, to palliate the ſymptoms.

It has ſometimes happened, in ſuppreſſion of urine, whether ariſing from ſtrictures in the urethra, or from ſtones impacted in it, that the urethra has burſt, and the urine, in this manner, getting acceſs to the cellular texture of the ſcrotum,

tum, an anaſarcous ſwelling riſes immediately over the whole of it; nor does it commonly diminiſh till the cauſe by which it is produced is removed.

In order to prevent the formation of ſinuſes, which, in ſuch circumſtances, will otherwiſe be apt to occur, an inciſion ſhould be made into the moſt depending part of the ſcrotum, and carried to ſuch a depth as is ſufficient for reaching the wound in the urethra. In this manner, a free vent will not only be given to the urine already diffuſed, but the further collection of it may probably be prevented. If a ſtone impacted in the urethra is found to be the cauſe of the effuſion, it ſhould be cut out; and, if the obſtruction is produced by ſtrictures, they muſt be removed by a proper uſe of bougies. The cauſe being thus removed, if the habit of body of the patient is good, and untainted with any venereal or other general affection, by dreſſing the ſore properly, with ſoft eaſy applications, the opening in the urethra will probably heal, and

and a complete cure will, in this manner, be obtained. But when theſe ailments are complicated with any general affection, particularly with lues venerea, neither mercury nor any other internal medicine, will remove them.

Caſes of this kind muſt have occurred to every practitioner. I have met with them, both in the Hoſpital and in private practice; where, notwithſtanding all the internal remedies that were employed, the paſſage from the urethra remained open, and continued to afford a vent to the urine. In ſuch caſes, we depend chiefly upon a proper application of bougies.

The ſcrotal anaſarca, of a local nature, has alſo happened from the rupture of a hydrocele of the tunica vaginalis teſtis: When the hydrocele of the tunica vaginalis arrives at a great ſize, jumping from a height, or a violent blow or bruiſe, will readily burſt it; and the water, not finding a paſſage outwardly, muſt neceſſarily diffuſe itſelf over he ſcrotum. Different inſtances of this have been met with,

two of which are related by Douglas *; and others have fallen within my own obſervation. A ſwelling of a ſimilar kind is alſo ſometimes induced by the water of a hydrocele of the tunica vaginalis being improperly drawn off in the operation of tapping. When the orifice in the ſkin is allowed to recede from the opening in the vaginal coat before the water is all diſcharged, as is apt to happen when the operation is done with a lancet, the remainder of the collection diffuſes itſelf through the cellular ſubſtance of the ſcrotum, an inconvenience that may be always prevented, by uſing a trocar for this operation, inſtead of a lancet.

In whatever way the ſwelling is produced, the cure ſhould conſiſt in laying the tumor ſufficiently open, not only for evacuating the diffuſed ſerum, but for effecting a radical cure of the hydrocele of the tunica vaginalis.

Some

* Treatiſe on the Hydrocele, by John Douglas, p. 8.

Some have imagined, that danger may enſue from performing the radical cure for the hydrocele in this ſituation; but I have done it in different inſtances, and no harm has ever enſued from it. The patient, in ſome caſes, may decline the operation, and, in others, his habit of body may render it improper; but, when this does not happen, few will doubt of its being better to give a patient, in ſuch circumſtances, immediate and effectual relief, by performing the radical cure at once, than to ſubject him, in the firſt inſtance, to a good deal of confinement, for removing the diffuſed ſwelling of the ſcrotum, and to leave him under the ſame neceſſity as before, of ſubmitting to the radical cure for the hydrocele of the tunica vaginalis.

When, for either of the reaſons, however, that I have mentioned, this operation is not to be performed, we endeavour to aſſiſt the diſcuſſion of the tumor, by ſuſpending the ſcrotum; confining the patient to a horizontal poſture; and by

the application of aſtringents to the parts affected. Of theſe we have a great variety; but I have found none anſwer ſo well as a cold ſolution of crude ſal ammoniac, in the proportion of half an ounce of the ſalt to a pound of water and two ounces of vinegar; or poultices, prepared with crumb of bread, ſoaked in equal parts of cold water, vinegar, and brandy.

I have thus conſidered all the varieties of anaſarcous tumors, to which the ſcrotum is liable, together with the mode of treatment that appears to be adapted to each of them; for, with reſpect to the hydrocele of the dartos, a diſeaſe particularly deſcribed by ancient writers, as that part of the ſcrotum is now known to be entirely cellular, ſo any water collected in it muſt tend to form that very diſeaſe we have juſt been deſcribing, an anaſarcous ſwelling of the whole ſcrotum.

We now proceed to conſider that ſpecies of hydrocele which, from being ſeat-

ed

ed within the cavity of the ſcrotum, may be termed the encyſted hydrocele of the ſcrotum. Of this there are two varieties, the hydrocele of the tunica vaginalis teſtis, and that ſpecies of tumor formed by water collected in the ſac of a hernia.

SEC-

SECTION III.

Of the Hydrocele of the Tunica Vaginalis Teſtis.

WHEN treating of the anatomy of theſe parts, I had occaſion to remark, that, in a ſtate of health, an aqueous ſecretion is always found in the tunica vaginalis; the principal uſe of which ſeems to be, to lubricate, and keep the ſurface of the teſticle ſoft and eaſy.

In a ſtate of health, this fluid is abſorbed by the lymphatics of the part, its place being ſupplied by a freſh ſecretion; but, in diſeaſe, it frequently happens, either that the ſecretion of this fluid is morbidly increaſed, or the powers of the abſorbing veſſels of the part are diminiſhed. The effect of either of theſe cauſes muſt be, to induce a preternatural collection in the

the cavity of the vaginal coat; and thus the variety of hydrocele is produced that we are now to consider.

The symptoms induced by it are these: A soft colourless tumor is at first perceived at the inferior point of the testicle; chiefly remarkable when the patient is erect: It excites no pain, and it does not become less by pressure. The shape of the tumor is at first nearly globular; but it afterwards becomes pyramidal, being larger below than above: As it advances in size, it becomes proportionally more tense, and the natural rugæ of the scrotum less perceptible. For a considerable time, it does not extend farther than the usual boundaries of the scrotum; but, on longer continuance, it advances to the abdominal muscles: so that, although in the early periods of the disease, the spermatic cord may be distinctly felt; in its more advanced state, it is not easily distinguished.

Before arriving at this height, the weight of the tumor is for the most part considerable,

confiderable, by which the fkin of the contiguous parts is dragged fo much downwards, as to make the penis fhrink confiderably, and fometimes difappear almoft entirely. In this advanced ftate of the difeafe, the tefticle, which ufually lies at the back-part of the tumor, and which, for fome time after its commencement, could be diftinctly felt, is not fo clearly difcovered. On minute examination, however, a hardnefs may always be felt along that part of the fcrotum where the teftis is fituated; and at this point, preffure excites fome degree of uneafinefs.

In a great proportion of cafes, the fluctuation of a fluid is obvioufly diftinguifhed on preffure. It fometimes happens, however, in that tenfe ftate of the tumor, ufually produced by a long continuance of the difeafe, that the fluid contained in it is not evidently difcovered: Nor, in this fituation, is the ordinary characteriftic mark of hydrocele more to be depended on; I mean the tranfparency of the tumor, when expofed to the light of a

candle,

candle, or of the ſun. In the early ſtages of the diſeaſe, when the contents of the tumor are not diſcoloured, and the vaginal coat has not acquired much thickneſs, the fluid contained in it, on being expoſed to this trial, uſually appears tranſparent; and, in meeting with this, we neceſſarily conſider it as a corroborating proof of the exiſtence of ſerum. The abſence, however, of this, is not a proof of the contrary; for, as the tranſparency of the tumor depends entirely on the nature of its contents, and on the thickneſs of its coverings, whatever tends to render the one leſs clear, and the other of a more firm texture, muſt, in proportion to this effect, invalidate the certainty of the teſt.

During the whole continuance of the diſeaſe, the patient does not complain of pain in the tumor itſelf; but ſome uneaſineſs is commonly felt in the back, by the weight of the tumor on the ſpermatic cord. This, however, is generally prevented entirely, or much alleviated, by the uſe of a ſuſpenſory bandage.

These

Theſe are the uſual appearances of a hydrocele when confined to one ſide of the ſcrotum. In ſome inſtances, however, we meet with a double hydrocele, when the tumor occupies the cavities of both tunicæ vaginales, and inſtead of being confined to one ſide of the ſcrotum, extends equally over the whole of it.

As this variety of hydrocele is ſometimes confounded with other diſeaſes, it is particularly neceſſary to hold ſuch circumſtances in view, as moſt certainly tend to characterize and diſtinguiſh them. Theſe diſeaſes are, all the varieties of ſcrotal herniæ; the anaſarcous hydrocele of the ſcrotum; the encyſted hydrocele of the ſpermatic cord; the ſarcocele, or ſchirrous teſticle; and the hernia humoralis, or inflamed teſtis.

In the hydrocele of the tunica vaginalis, the tumor begins at the bottom of the ſcrotum, and proceeds ſlowly upwards. It is of a ſmooth equal ſurface. In a great proportion of caſes the ſpermatic cord is felt at the upper part of it, and the fluctua-

tion of a fluid is diſtinguiſhed through its whole extent. Preſſure does not make the ſwelling recede, nor is it affected by the poſture of the patient, if it be not on its very firſt approach; whereas, in hernia, beſides pain, ſickneſs, and other affections of the ſtomach and bowels which commonly take place, the tumor begins in the groin, and only at laſt proceeds to the ſcrotum. It has not the pyramidal form of a hydrocele. It is frequently ſoft and compreſſible, giving a ſenſation ſimilar to what we receive from preſſure upon dough; but no equal or diſtinct fluctuation is perceived in it. In moſt inſtances, the tumor can be made to recede, either altogether or in part, by moderate preſſure, and putting the patient in a horizontal poſture; and in hernia deſcending to the ſcrotum, the ſpermatic cord can never be clearly diſtinguiſhed.

However improbable it may appear, this variety of hydrocele has, in ſome inſtances been confounded with anaſarcous tumors of the ſcrotum; but the means of

diſtinction

diſtinction are ſo evident, from the hiſtory which I have given of the two diſeaſes, that it is not here neceſſary to enter farther upon the ſubject. It muſt, indeed, be groſs inattention only that can ever make the anaſarcous hydrocele be miſtaken for any other diſeaſe.

From the encyſted hydrocele of the ſpermatic cord, it may commonly be diſtinguiſhed by the teſticle in the latter being plainly felt at the under part of the tumor; whereas, in this diſeaſe, the teſtis is ſeldom diſtinctly perceived if it be not at the back-part of the tumor. In two caſes, I have met with the teſticle on the anterior part of a hydrocele; and, in a third, although fixed behind in its uſual ſituation, it alſo adhered at one point to the middle and anterior part of the tunica vaginalis. This I ſuſpected to be the effect of inflammation, induced either by hernia humeralis or ſome other diſeaſe; and on inquiry, it appeared that the patient at one time had been long confined with inflammation of this teſticle, the effect of a bruiſe.

In

In the encyfted hydrocele of the cord, the tumor firft appears above the tefticle, and by degrees falls downwards; while the very reverfe happens in the hydrocele of the tunica vaginalis, in which the tumor at firft always forms below, and from thence proceeds upwards.

In a few inftances, thefe two varieties of hydrocele have been known to exift at the fame time in the fame patient. In this cafe the ferum, although collected in two diftinct cyfts, gives the appearance of one uniform tumor; and a fluctuation is diftinctly felt from one end of it to the other. But, in any inftance that I have feen of this combination, the tumor has been fomewhat contracted, having rather a lefs diameter at that part where the two collections are feparated from each other; fo that, where this appearance takes place, we may, in general, fufpect that the ferum is collected in two diftinct bags. This, however, does not always happen; for occafionally I have met with this appearance

where the diſeaſe was fixed in the tunica vaginalis alone.

The circumſtances which moſt clearly diſtinguiſh hydrocele from a ſchirrous teſticle are theſe: In the latter the ſwelling is hard; it does not yield in any degree to preſſure; the ſurface of the tumor is commonly rough and unequal; it is in general attended with a good deal of pain, and is always heavy in proportion to its ſize: Whereas, in hydrocele, the ſwelling commonly yields to preſſure; its ſurface is ſmooth; little or no pain takes place; and the tumor is light in proportion to its bulk.

Theſe differences will always ſerve as a ſufficient means of diſtinction between this ſpecies of hydrocele and a pure unmixed ſarcocele. But when a ſchirrous teſticle is combined with an effuſion of water into the tunica vaginalis, forming what has very properly been termed a hydro-ſarcocele, the means of diſtinction are not ſo obvious. In the incipient ſtate of theſe effuſions, the difference between the

the two diseases is sufficiently apparent; but, when far advanced, the most attentive observer often finds it difficult, and sometimes impossible, to mark the distinction. In such doubtful cases, however, by proceeding in the cautious manner to be afterwards pointed out, no detriment will occur to the patient, from any uncertainty that may take place.

From the hernia humeralis, this species of hydrocele is easily distinguished. In the former, the tumor succeeds either immediately to some external bruise, or it is evidently the consequence of a gonorrhœa, or of some other inflammatory affection of the urethra *. The skin is more or less affected with an inflammatory redness; it is attended with much pain, especially on being handled, and the tumor is hard and firm, so that no fluctuation is

* The operation of lithotomy is frequently attended with an inflammation of one, and sometimes of both testicles; probably from the inflammation induced by the operation in the neighbourhood of the caput gallinaginis, being communicated along the vas deferens to the testes.

felt in it, unleſs in its more advanced ſtate, when ſuppuration ſometimes, although rarely, takes place between the ſcrotum and teſticle; in which caſe, the uſual ſymptoms of abſceſs, particularly the pointing of the tumor, and its being much diſcoloured, ſerve to diſtinguiſh it.

In forming a prognoſis of this diſeaſe, we ſhould be chiefly directed by the habit of body of the patient. In a great proportion of caſes we are to conſider it as a local affection; and, in this ſtate the moſt favourable expectations may be formed of it. For, whatever may have been alleged by ſome, of the hazard of every operation for a radical cure, in a ſimple unmixed hydrocele, if the conſtitution is not very unhealthy, it may at all times be adviſed with a very fair proſpect of ſucceſs.

In the radical cure of the hydrocele, in whatever way it is done, ſome pain will be excited; the parts will inflame, and of courſe ſome degree of fever will take place.

In ſome inſtances, theſe ſympoms have gone rather farther than was wiſhed for; but, under the limitations I have mention-ed, of an unmixed ſtate of the diſeaſe, in a conſtitution otherwiſe healthy, the opera-tion I ſhall preſently deſcribe, when pro-perly performed, and the cure thereafter rightly conducted, never fails of the moſt complete ſucceſs, while, in no inſtance, has it ever, in the courſe of my experience, proved fatal.

But, on the contrary, in conſtitutions otherwiſe diſeaſed, in very aged people, and in infirm habits of body, we are by no means to expect ſuch certain ſucceſs: Even in ſuch circumſtances, however, the operation often ſucceeds. I have, in vari-ous inſtances, performed it under one or other of theſe diſadvantages, and I never knew it fail. Others, however, have found that it has done ſo; and it may readily be ſuppoſed, when practiſed upon the old, infirm, and diſeaſed, that the ſymptomatic fever may run too high for the ſtrength of the patient; and that the ſuppuration

produced by a high degree of inflammation, may afterwards tend to deſtroy the remains of a conſtitution already greatly impaired. This, however, ſhould not be laid to the account of the operation, but to the impropriety on the part of ſurgeons, in adviſing it in patients already perhaps in danger with other diſeaſes. In ſuch circumſtances, no operation ſhould be performed, and the patient ſhould be deſired to truſt entirely to a proper uſe of a ſuſpenſory bandage.

In judging therefore of the event of a hydrocele, I would ſay, that in conſtitutions ſuch as the operation ſhould be adviſed in, ſcarcely any danger is to be dreaded; while, on the contrary, in the infirm, and eſpecially in ſuch as are otherwiſe unhealthy, that ſome riſk will occur from any operation we can propoſe, and that the degree of riſk will be nearly in proportion to the nature and extent of that diſeaſe with which the conſtitution is affected.

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As long as a hydrocele keeps within moderate limits, patients, in general, rather ſubmit to the inconvenience than undergo the pain of an operation; at leaſt this is commonly the caſe with people of rank, who can more readily ſubmit to any diſtreſs which it excites, than patients of a poorer claſs, whoſe labour is frequently impeded by the ſize of the tumor. At laſt, however, by its bulk, it excites in all a ſtrong deſire to have it removed; for, beſides the deſire naturally implanted in all mankind, to be ſound and entire in theſe parts, the water collected in a hydrocele, is, in ſome inſtances, ſo very conſiderable, as to be the cauſe of much inconvenience. When, from timidity, or any other cauſe, the operation has been too long delayed, I have known the tumor become ſo large, as in courſe of time to cover a conſiderable part of each thigh, and in length to extend from the groin to the knee.

Various methods have been propoſed for the cure of hydrocele; all of which, however, may be reduced to two: Such as

have in view only a temporary relief, and which is therefore termed the palliative cure; and ſuch as are meant to effect a radical cure, or a final removal of the diſeaſe.

Whatever advantages may be experienced from the uſe of internal medicines, in dropſy of the conſtitution, no practitioner, I believe, has ſo much confidence in remedies of this claſs, as to expect much advantage from them in encyſted dropſy of any kind. We have daily proofs of their failure in partial hydropic collections, wherever they are ſeated; and in none more frequently than in the hydrocele.

We are told, indeed, of this diſeaſe being cured by different medicines, particularly by the uſe of draſtic purgatives; but, although I have often known them employed, it was never with any advantage, and, when puſhed to any extent, they are ſure to do harm. As it is always proper, however, to confine the patient to bed for ſome time after any operation of import-

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ance, in order to prevent him from being afterwards diſturbed, his bowels ſhould be emptied by a purge immediately before any operation for the radical cure of a hydrocele is performed; but this is almoſt the only way in which purgatives can here prove uſeful. Internal medicines, therefore, being found ineffectual, and we know of no external applications to be depended upon, we are to ſeek for that relief from ſurgery which experience ſhows it never fails to afford.

When the tumor in the ſcrotum has become ſo large as to be inconvenient from its ſize, if the patient either refuſes to ſubmit to the operation for a radical cure, or if his ſtate of health renders that operation improper, in ſuch circumſtances, the palliative treatment, or a mere evacuation of the water by puncture, is the only means we can employ.

Two methods are propoſed for drawing off the water in this manner; by the puncture of a lancet, and piercing with a trocar. By ſome it is alleged, that by the puncture of

of a lancet the water can neither be ſo completely or ſo properly drawn off as with a trocar; for the orifice in the ſkin being apt to recede from the opening in the tunica vaginalis, the water is thereby either ſtopt altogether, or is apt to inſinuate into the ſurrounding parts. By others again, it is ſaid, that the difficulty of introducing the trocar is ſuch as to render it hazardous from the contiguity of the teſticle; and inſtances are not wanting to ſhow, that, even in the hands of expert ſurgeons, the teſtis has been much injured by a trocar reaching it in this operation. Indeed the ordinary triangular form of this inſtrument makes it both difficult and unſafe to introduce it; but the trocar, of a flat form, an improvement which I propoſed a good many years ago, enters with as much eaſe as a lancet. This inſtrument is repreſented in Plate LIX. fig. 4.; and in Plate LVIII. fig. 2. another form of the trocar is delineated, with either of which, an opening may be made in the tunica vaginalis with perfect ſafety, and the

the water with this inſtrument being much more freely drawn off than with a lancet, by which effuſions are often produced into the cellular ſubſtance of the ſcrotum, the uſe of a lancet for this purpoſe ſhould therefore be laid aſide.

The inſtrument being fixed on, the next point of importance is the part of the tumor in which the puncture ſhould be made. Even in this ſimple operation, an acquaintance with the anatomy of the parts proves uſeful. The teſtes, as I have endeavoured to ſhow, do not hang looſe in their vaginal coats; being, on the contrary, firmly attached to them behind. Hence at this part, even in the largeſt hydrocele, no fluid is met with; ſo that if, through ignorance or inattention, the trocar ſhould be inſerted here, one inſtance of which I have ſeen, the inſtrument would pierce the body of the teſtis, while it would not leſſen the tumor, as it would not reach the cavity of the vaginal coat in which the fluid is collected. The trocar ſhould be introduced

in

in the anterior and moſt depending part of the tumor.

The patient being ſeated in a chair, or on a table, with the ſcrotum hanging over the edge of it, the operator, with his left hand, ſhould graſp the tumor behind, in ſuch a manner as to puſh the contained fluid as much as poſſible into the anterior and under part of it. This being done, if a common round trocar is uſed, a ſmall opening about a quarter of an inch in length ſhould be made through the ſkin, with the ſhoulder of a lancet, on that point where the trocar is to enter; but with a flat trocar this precaution of previouſly dividing the ſkin is unneceſſary. The operator now takes the trocar in his right hand, and having fixed the head of it in the palm of his hand, he places the forefinger along the courſe of it, leaving as much of the point of the inſtrument uncovered as may freely penetrate the tunica vaginalis; and this being puſhed in, the ſtilette ſhould be withdrawn immediately on the end of the canula having entered the cyſt. The

water

water will now run off; and, if the tumor is not uncommonly large, it may be all drawn off at once; but when the swelling is large, as the sudden discharge of the fluid, by taking away too quickly the support which it gave to the vessels of the testis and vaginal coat, might endanger the rupture of some of them, it is better from time to time to stop the flow of it for a few seconds; and when the whole is thus evacuated, and the canula withdrawn, a piece of adhesive plaster should be immediately applied to the orifice; and a compress of soft linen being laid over the scrotum, the whole should be firmly supported, either with a well-adapted suspensory, or a proper application of the T bandage *.

The patient being in this state laid in bed, all kind of uneasiness is, in a few minutes, commonly gone, and he goes about

* Some very judicious remarks, on the importance of a due compression in such cases, may be met with in remarks upon this subject, in the works of the late Dr Monro.

about his ordinary buſineſs without interruption. In a few inſtançes, however, it has happened, either from the external air finding acceſs to the teſticle, or from the ſore produced by the trocar becoming inflamed, that the whole body of the teſticle has been ſeized with inflammation, by which a radical cure of the diſeaſe has been obtained. This, however, is a rare occurrence, and hardly to be looked for.

About four years ago, the public was favoured with ſome obſervations on this diſeaſe by Mr Keate of London, in which ſome caſes are related of hydrocele being cured by the external uſe of a ſtimulating application, a ſtrong ſolution of ſal ammoniac in vinegar and ſpirit of wine. The following is the formula employed by Mr Keate.

℞. Sal. ammoniac. in pulv. trit. ℥ i.
Acet. ſpirit. vin. rect. ſing. ℥ iv.

A quantity of ſoft old linen, well moiſtened in this, is deſired to be folded round the

the ſcrotum, to be ſupported with a ſuſpenſory bag, and renewed three times a day: But, although I have given this method a fair trial in upwards of twenty caſes, in ſome while the cyſt remained diſtended, and in others immediately after the water was drawn off, I have not been ſo fortunate as to ſucceed. In ſome, the application of different ſtimulants and aſtringents after the operation of tapping, has appeared to prevent the collection from returning ſo quickly as it otherwiſe might have done; but even this has not been frequent, and in no inſtance, in the courſe of my obſervation, has it produced a cure.

With the ſame view, I have employed a variety of ſtimulants and aſtringents, ſuch as volatile liniment, prepared with ſix parts of oil, one of camphor, and one of ſpirit of hartſhorn; tincture of cantharides; the ſteams of vinegar; poultices of vinegar and crumb of bread; and compreſſes of linen, ſoaked in brandy: and the practice being neither attended with

with difficulty or hazard, I mean to continue it till farther experience ſhows, whether it ſhould be retained or not. That it will often prove ſucceſsful in removing a hydrocele, by promoting the abſorption of the fluid contained in the tunica vaginalis, is ſcarcely to be expected; but we may reaſonably ſuppoſe, that ſtimulating applications, capable of exciting inflammation in the teſtes, may accompliſh a cure, after the water has been drawn off with a trocar.

Drawing off the water with a trocar is an operation eaſily performed, and it very ſeldom does harm; but when not done with caution, eſpecially when the patient is allowed to walk or ride ſoon after the water is taken away, it ſometimes ends in very troubleſome ſymptoms. If the habit of body is bad, this will happen with whatever attention it may be done. Of this every practitioner may have met with inſtances; and two are related by Mr Pott, one of which terminated fatally, and gangrene enſued in the other, which,

which, in a few days, destroyed not only a good deal of the scrotum, but even a considerable portion of the tunica vaginalis *. Both of these, indeed, occurred in very unhealthy constitutions; but it is proper to have it known, that even this operation may, in certain habits of body, be productive of very distressful consequences.

Drawing the water off in this manner, in order to give relief from the bulk and weight which it produced, would probably be the first idea that occurred to practitioners in the treatment of hydrocele; but being found inadequate to the complete removal of the disease, various other methods were afterwards introduced. The actual cautery, and the ligature, were both proposed as means of preventing farther descents of water from the abdomen, which, in former times, was considered as the origin of this disease. Celsus advises the cyst of a hydrocele to be cut away, and many of his followers do the same. Tents, both

* Cases xxi. and xxii. Treatise on the Hydrocele.

both ſolid and hollow, were afterwards employed; as was likewiſe the uſe of the ſeton, which we find recommended by Fabricius ab Aquapendente, and other writers, even of a more early period. Various applications, of the cauſtic kind, have at different times been in vogue: Injecting wine, diluted ardent ſpirits, and other irritating liquids, into an opening in the vaginal coat, has been propoſed, as a means of inducing a degree of inflammation ſufficient for affecting a radical cure; and a ſimple inciſion of the cyſt containing the water, has been practiſed for the ſame purpoſe. Theſe are the means which, at different periods, have been employed for the cure of hydrocele. Ancient practitioners ſeem to have been acquainted with all of them; but having very inaccurate ideas of the anatomy of the parts concerned, they could not have any fixed or clear opinion of the manner in which any of their remedies acted in effecting a cure. In conſequence of this, they were applied at random; and none of them proving in general

general ſucceſsful, the ignorance they laboured under in the theory of the diſeaſe, made them frequently propoſe varieties in the method of cure.

The moderns poſſeſs one important advantage over the ancients, from knowing that the water in hydrocele is contained in a particular cyſt having no immediate communication with any other part or cavity of the body, and from finding that this diſeaſe reſembles, in many reſpects, other encyſted tumors, with the means of curing which they are well acquainted.

Both in encyſted tumors and hydrocele, the contents of the ſwelling are ſecluded from the external air. Neither of them have any communication with any other part of the body; and, although the bag containing the matter of an encyſted tumor, is, in ſome meaſure, a new formation, yet, in many inſtances, it is found to be equally firm and elaſtic with the tunica vaginalis teſtis.

In the treatment of encyſted tumors, practitioners are now agreed, that, beſides

evacuating the matter, means muſt be employed for deſtroying the cavity which contained it, otherwiſe it will collect again. To accompliſh this, different methods have been propoſed; ſome with a view to deſtroy entirely the cyſt which contained the matter, and others, as it is ſaid, to fill up the cavity, by a formation of new parts.

But we know, that unleſs the coats of a cyſt are much extended, hard, or greatly thickened indeed, no part of it ſhould be removed. It is alſo known, that to fill up the cavities of tumors with a formation of new parts, is a mere imaginary thing, being what neither nature or art can do to any extent; and we likewiſe know, that the cavity of every tumor may be more effectually deſtroyed by producing an adheſion of its ſides, than by any other means.

Parts of the human body, in a ſtate of inflammation, very readily adhere together. So eaſily indeed do they do ſo, that ſome art is required to prevent the adheſion

adhesion of contiguous inflamed parts, of which every practitioner must have met with examples. Hence, abscesses and encysted tumors are more easily cured by exciting inflammation over their internal surfaces, after their contents are evacuated, than by any other means; and, in like manner, it is now known, that the hydrocele of the tunica vaginalis may be treated upon the same principles, and with the same general effects.

This is the most simple idea that can be given of the practice that should be kept in view in the cure of hydrocele; and I hope it will serve to render it clear and intelligible.

The intention, then, of every means now in use for the radical cure of this species of hydrocele, is, to induce such a degree of inflammation on the parts in which it is seated, as may tend to obliterate entirely the cavity of the tunica vaginalis, by making it adhere firmly to the tunica albuginea, the surface of the testicle.

Some individuals, indeed, ſtill proceed upon the ſuppoſition of a total deſtruction of the ſac being neceſſary for a complete cure; but extenſive experience now makes it evident that this is not the caſe. When the ſac has become unuſually thick or hard, it proves ſometimes uſeful to remove thoſe parts of it that are particularly diſeaſed; and when it has been diſtended to ſuch a degree as entirely to have loſt its tone, removing a part of it may forward the cure, by allowing the ſcrotum to contract more readily; but it happens ſo ſeldom from any of theſe cauſes, that I have only met with a very few inſtances, in which it appeared neceſſary to remove any part of it. A cure may indeed be obtained of this variety of hydrocele, by removing the ſac entirely; for the contiguous parts from which it is cut away, readily adhere together, ſo as to deſtroy the cavity in which the fluid was contained; but what I wiſh to have underſtood, is, that we are not to conſider it as neceſſary, as the ſame end may

may be obtained by much more lenient meaſures.

I ſhall now proceed to ſpeak more particularly of the ſeveral means at preſent moſt frequently employed by practitioners for effecting a cure, and ſhall treat moſt minutely of thoſe now in general uſe. Theſe are, exciſion of the tunica vaginalis; the application of cauſtic; the uſe of a ſeton; a ſimple inciſion of the ſac; and injecting wine and other acrid liquors into the tunica vaginalis, after drawing off the fluid which it contained.

The method of cure, by removing the vaginal coat, which was well known to the ancients, had nearly fallen into diſuſe, when it was revived by the late Mr Douglas of London; and by a few practitioners it is ſtill continued. The method of doing it is, firſt to diſſect out an oval piece of the ſcrotum, which Mr Douglas conſiders as always neceſſary; and having then laid the vaginal coat open, to cut it away by different ſnips with ſciſſars. But, whoever may continue to think favourably

vourably of the exciſion of the ſac, will find, that it may be more eaſily done with a ſcalpel than with ſciſſars; and it can ſeldom or never be neceſſary to remove any portion of the ſcrotum.

As much danger might enſue from the inciſion being carried too near to the teſticle, all the poſterior part of the ſac, or that part of it by which the teſticle is connected to the ſcrotum, ſhould be allowed to remain. On the ſac being removed, the parts muſt be dreſſed, and treated in every other reſpect in the ſame manner as in the operation with the ſimple inciſion to be hereafter deſcribed.

The cure by cauſtic has commonly been conducted as follows: The ſcrotum being ſhaved, a piece of common paſte cauſtic, properly ſecured with adheſive plaſter, is applied, of about a finger's breadth, the whole length of the tumor; and if, on removing the cauſtic, it has not penetrated the tunica vaginalis, an opening is made in it with a ſcalpel, ſo as to evacu-

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ate the contents, lay bare the teſticle, and admit of proper dreſſings.

But Mr Elſe, one of the lateſt writers in favour of the method of cure by cauſtic, ſays, that there is no neceſſity for ſuch an extenſive application of cauſtic as many have recommended; that an eſchar, of the ſize of a ſhilling, is ſufficient; that this may be always fully obtained by the application of cauſtic paſte, of the ſize of a ſixpence, which he directs to be laid upon the anterior and under point of the ſcrotum, and to be properly ſecured by adheſive plaſter, in order to prevent it from ſpreading *.

The cauſtic commonly produces all its effects in the ſpace of five or ſix hours, and may then be removed. At this time, digeſtives, or an emollient poultice, muſt be applied over the ſcrotum; and the whole properly ſuſpended with a bandage.

Inflammation, Mr Elſe obſerves, is ſoon induced over the whole tunica vaginalis; and the febrile ſymptoms that ſucceed, he adviſes

* Vide An Eſſay on the cure of the hydrocele of the tunica vaginalis teſtis, by Mr Elſe, 2d edit. p. 33.

advifes to be kept moderate by blood-letting, injections, emollient poultices, and a low regimen. In a few days, the efchar of the fcrotum feparates, and comes away; and, in a gradual manner, in the courfe of four, five, or fix weeks, the whole tunica vaginalis comes off, when the wound, for the moft part, foon heals, and a complete cure is obtained.

In the cure of the hydrocele by the feton, the following is the method of applying it, as advifed by the late Mr Pott, who wrote a full and ingenious treatife on the fubject: He ufed a trocar; a filver canula, five inches in length, and of fuch a diameter as to pafs eafily through the canula of the trocar; and a probe, fix inches and a half long, having, at one end, a fine fteel trocar-point, and at the other, an eye, which carries a cord of coarfe white fewing filk, of fuch thicknefs as to pafs eafily through the long canula. With the trocar the inferior and anterior point of the tumor is to be pierced; and, as foon as the perforator is withdrawn,

withdrawn, and the water difcharged, the feton canula is paffed through that of the trocar, till it reaches the upper part of the tunica vaginalis, and is felt in the fuperior part of the fcrotum. This being done, the probe, armed with its feton, is to be conveyed through the latter canula, the vaginal coat and teguments to be pierced with the point of it, and the feton to be drawn through the canula, till a fufficient quantity is brought out at the upper orifice, when both canulas are to be withdrawn, and the operation is finifhed.

About the end of the third day, the parts begin to inflame; when fomentations, poultices, a fufpenfory bandage, a temperate regimen, and a lax belly, are ordered, to keep the fymptoms moderate. As foon as the parts become eafy, by the inflammation leffening, which is generally about the tenth or twelfth day, the feton is begun to be diminifhed, when fix or eight threads are withdrawn at every dreffing; the dreffing, confifting of nothing more than a fuperficial pledget on each orifice, and

and a discutient cerate, such as the ceratum saturninum, to cover the scrotum.

In the treatment of the hydrocele with a seton, I should wish to follow Mr Pott's method, in every circumstance but the mode of introducing it, which is rendered unnecessarily complex, by the number of instruments proposed for it. In Chapter I., I have described the manner of opening abscesses with a seton, and the directions then given prove equally applicable here.

Let an opening be made with a scalpel, a large lancet, or sharp-pointed bistoury, in the superior part of the tumor, large enough to admit, with ease, a cord, consisting of about thirty threads of common white sewing silk. A director, with an eye at one end, Plate LXVII. fig. 3. in which the cord is inserted, is to be introduced at this opening; and its farther extremity being carried down to the most depending part of the tumor, an opening is there to be made, half an inch in length, by cutting on the director with the bistoury. The

The director being now drawn down till a ſufficient quantity of ſilk is left hanging out below, the operation is in this manner finiſhed. In every other reſpect, the management of the ſeton ſhould be the ſame with the method deſcribed above from Mr Pott; or, inſtead of introducing the cord with a director, it may be done with a ſilver canula and perforator, repreſented in Plate LXVII. fig. 1. 2. and 4.

By making the firſt opening in the upper part of the tumor, the inſtrument conducting the ſeton is more eaſily introduced along the courſe of it, than when the firſt opening is made below; for, in this caſe, the tumor remains diſtended to the laſt: whereas, when opened below, the contents ruſh out immediately; and the vaginal coat collapſes ſo much about the teſticle, that I have known it difficult to get the inſtrument inſinuated between them, by which the teſtis has, in different inſtances, been injured; and, by making the under opening half an inch long, any matter which forms in the courſe of the

cure

cure is eaſily and readily diſcharged: whereas, in Mr Pott's method of operating, where the opening is not larger than the ſize of the trocar, as this is completely filled by the cord, the matter is thereby allowed to collect; an inciſion becomes neceſſary, to diſcharge it; and thus the patient is expoſed to pain and diſappointment, as I have ſeen in various inſtances, where the precaution I have mentioned has been omitted, of making the opening at the moſt depending part of the tumor ſufficiently large for diſcharging any matter that may form.

Before entering farther into the conſideration of the method of cure by the ſeton, I ſhall proceed to deſcribe the operation for a radical cure, by inciſion.

The patient being laid upon a table of convenient height, and properly ſecured by aſſiſtants, with the ſcrotum lying nearly on the edge of the table, the operator, with one hand, ſhould graſp the tumor behind, ſo as to hold it firm, and make it ſomewhat tenſe on the anterior part of it:

it: With a round-edged ſcalpel in the other, he ſhould now divide the external teguments by one continued inciſion from the upper end of the tumor, all along its anterior ſurface, down to the moſt depending point of it.

If the inciſion has been properly made, the divided ſcrotum will retract, and the tunica vaginalis will be laid bare, for the breadth of about half an inch over its whole length. An opening is now to be made in the vaginal coat, juſt at the upper end of the tumor, where the firſt inciſion commenced, and it may be done either with a lancet, or ſharp-pointed biſtoury, or a ſcalpel. This opening ſhould be of ſuch a ſize, as freely to receive the finger of the operator; which, being inſerted, a probe-pointed biſtoury is to be conducted upon it, and the ſac divided to the very bottom, directly in the courſe of the firſt inciſion. By the previous diviſion, of the ſkin, with the ſcalpel inſtead of the biſtoury, the operation is done with more accuracy, and leſs pain; for the ſcalpel,

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from its convexity, admits of a finer edge than an inſtrument of any other form is capable of receiving, and hence it cuts with more eaſe.

By making the inciſion of the teguments and tunica vaginalis together, as in ſome inſtances I have ſeen done, the operation may be ſomewhat ſhortened; but the time gained by it is not more than a ſecond or two, while the inciſion is apt to be ragged and unequal: for, when done in this manner, particularly if the tunica vaginalis is firſt opened in the moſt depending part of it, as ſome have adviſed, the parts cannot be kept ſufficiently tenſe for completing the inciſion.

I have deſired, that the firſt opening in the vaginal coat may be ſo large, as eaſily to receive the finger of the operator, which ought to be puſhed in behind the biſtoury, without withdrawing the inſtrument, as is commonly done. In this manner, we ſhorten the operation, and, by giving a free vent to the fluid contained in the ſac, we prevent it from ſpreading and

and forming vesications in the cellular substance of the vaginal coat, and contiguous part, as it is apt to do when the opening in the sac is too small. By making the first opening in the upper end of the sac, much trouble and inconvenience is prevented, which always occur from making it below. For, as I have before remarked, when the tumor is first opened below, the water is instantly discharged; and, as this is followed by an immediate collapse of the tunica vaginalis, the direction in which it should be cut is not afterwards easily discovered; whereas, by making the first opening above, as the water is thereby gradually emptied on the opening being carried downwards, the vaginal coat continues distended at the bottom, till the whole is finished.

With a view to save some pain to the patient, the late Mr Hunter advised the incision, both of the scrotum and tunica vaginalis, to be only two-thirds of the length of the tumor; and others have thought even that one-half of this is suffi-

 cient.

cient. But the difference of pain between incifions of thefe different lengths is inconfiderable, and not to be regarded when compared with the effects that refult from them. When the incifion is carried the full length of the tumor, the operation fucceeds in every inftance, if the fubfequent part of the treatment meets with due attention; whereas I have known various inftances of thefe partial openings being followed with a return of the difeafe.

It is particularly proper to carry the incifion of the tunica vaginalis, down to the moft depending point of the tumor; otherwife the contents of the fac will not be completely difcharged, while room will be given for collections of matter during the cure. It is alfo proper to remark, that, in making this incifion of the fac, it ought to terminate at fome diftance from the teftis; for I have, in different inftances, obferved, where the vaginal coat has been cut near to the tefticle, that the inflammation was particularly fevere.

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The incision being completed, the testicle covered with its tunica albugina, is brought fully in view. In some instances, the testis protrudes from the surrounding parts; in which case, it should be immediately replaced, and covered as quickly as possible from the air; and if no part of the tunica vaginalis is to be removed, the dressing may be finished directly on the sac being opened.

Unless the sac is diseased, or so much distended as entirely to have lost its tone, no part of it, as I have observed above, should be removed: but when hardened to the firmness of cartilage, as I have more than once seen, as, in this state, it is apt to excite pain when applied to the tender surface of the testis, it ought undoubtedly to be removed; and as, in this state, it commonly separates with ease from the surrounding cellular substance, it is easily and quickly cut away with a scalpel or bistoury. The removal of any portion of the sac from the mere enlargement of the

tumor, can ſeldom be neceſſary; not once in fifty inſtances.

Hitherto I have been ſuppoſing that the diſeaſe is confined to one ſide of the ſcrotum; but, in ſome inſtances, as I have remarked above, we meet with a hydrocele in both ſides at once. In this caſe, the common practice is, to do the operation twice in all its parts, both in the ſcrotum and tunica vaginalis, by laying each collection open, from top to bottom, by a double inciſion. Some adviſe both operations to be done at the ſame time; but, in general, practitioners are afraid of too much inflammation being induced by this; ſo that one ſide is commonly allowed to heal before the other is opened. In this manner, the patient is expoſed to delay, uncertainty, and to the confinement ariſing from two operations.

This, however, is not neceſſary, as the operation may be done on both ſides at once, with little more pain, and, ſo far as I have ſeen, with no more hazard, than in the uſual method of doing them ſeparately,

ly. The method in which I have done it is this:

After finiſhing the operation on one ſide, an opening is made into the vaginal coat of the oppoſite teſticle, at the upper end of it, through the ſeptum ſcroti; and the inciſion being carried down to the bottom of the tumor, the cyſt is thus equally well laid open, the ſerum is as completely diſcharged, and the diſeaſe is not more liable to return, than by doing the operation in the uſual manner, and at different times.

Whether the hydrocele is double, or confined to one ſide, as ſoon as the inciſion is finiſhed, if the teſtis is ſound, the wound ſhould be quickly dreſſed; and, I think it right to obſerve, that, on the manner in which this is done, much of the ſucceſs of the operation at all times depends, more indeed than is commonly imagined.

If the vaginal coat is merely wrapped about the teſticle, without the interpoſition of dreſſings, or, if the divided ſides

of it are immediately united with futures, as fome have advifed, partial adhefions are apt to take place, before a degree of inflammation is produced over the whole, fufficient for rendering the cure complete. In this manner, cavities are left, which either fill with pus during the cure, and require to be laid open, or they afterwards give rife to collections of ferum, and thus occafion a return of the difeafe, different inftances of which have fallen within my obfervation. And, again, the practice of ftuffing the cavity of the fore with dreffings, is alfo a frequent caufe of mifchief. By rubbing, or preffing upon the furface of the teftis, fuch a degree of inflammation is fometimes induced, as excites much pain, inflammation, and fever. But this is almoft always the fault of the operator; for, in a great proportion of cafes, if the dreffings are properly managed, no violent fymptoms ever occur.

After having tried various ways of dreffing the parts, the method I have now long purfued, and which in no inftance I have found

found to fail, is this: The testicle being properly placed in the newly divided sac, two pieces of soft old linen, exactly the length of the cut, previously dipped in a liniment of wax and oil, are, by the help of a probe, inserted to the bottom of the sac, one on each side of the testicle, between it and the vaginal coat, care being taken to leave a sufficient quantity of each pledget hanging out of the wound, to admit of its being easily withdrawn at the first dressing; otherwise, if the swelling, which afterwards takes place, shall be considerable, they may, for some days, be entirely covered, and even at last removed with difficulty, as I have seen in different instances where this piece of attention has been omitted.

If the testicle has pushed forward, and is with difficulty retained in its situation, as it will be apt to slip out between the lips of the wound between one dressing and another, no means should be omitted that can, with safety, be employed for preventing it, as it cannot afterwards be

ſo eaſily replaced; and, from want of attention to this, I have known the teſticle entirely extruded from the ſcrotum, and, in one inſtance, from ſufficient pains not being taken to replace it, the cure was completed with the teſtis in this ſituation; when, inſtead of being covered with the vaginal coat and ſcrotum, it was covered with ſcarf-ſkin only.

The beſt method of preventing ſuch a misfortune, is, to draw the edges of the divided tunica vaginalis and ſcrotum nearly together, after the teſtis has been properly placed, and the pledgets of oiled linen inſerted; and, in this ſituation, to ſecure them, either with two or three ſutures, at proper diſtances from each other, or with ſlips of plaſter, ſufficiently adheſive for retaining them.

This being done, the whole ſcrotum is covered with a large pledget of ſaturnine cerate, or common wax ointment, by which the parts are kept much more ſoft and eaſy, than when dreſſed, in the uſual way, with dry lint, at the ſame time that the

the dreſſings are much more eaſily removed. A cuſhion of ſoft tow, with a proper compreſs, is placed over the pledget of ointment, and the whole are retained by the T bandage, or common ſuſpenſory bag. The patient is now carried to bed: A quieting draught ſhould be given; and he ſhould be enjoined to remain as much as poſſible in the ſame poſture; for much motion at this period certainly does harm.

The intention of this operation being to induce a moderate degree of inflammation in the tunica vaginalis and ſurface of the teſticle, if the pain, inflammation, and ſwelling, which, in ſome degree, always ſucceed, do not run to a great height, nothing is to be done for the firſt two or three days after the operation; but, when theſe ſymptoms become violent, and eſpecially when much fever is induced, means muſt be employed to leſſen or remove them.

The remedies we chiefly depend on, are, blood-letting, gentle laxatives, a low cooling diet, and warm emollient poul-

tices

tices and fomentations to the part, in order to forward a plentiful ſuppuration, which commonly tends to moderate every bad ſymptom more effectually than any other remedy. By theſe means, the inflammation is in general eaſily kept within proper bounds; but where the mode of dreſſing I have pointed out is adopted, they are not often required. In a great number of caſes, in which I have done the operation in this manner, I have only once found it neceſſary to adviſe blood-letting, and very rarely fomentations or poultices.

In moſt caſes, the inflammation of the teſticle does not riſe higher than in the ſimple hernia humoralis from gonorrhœa; and it gradually ſubſides as the ſuppuration advances. The abatement of the inflammation is alſo aſſiſted by continuing a cool diet, the occaſional uſe of opiates, and keeping the belly open.

Often in two days, and always by the end of the third, I remove all the dreſſings, except the pledgets inſerted between

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the teſtis and tunica vaginalis. This is one important advantage we derive from covering large ſores with pledgets of ointment. The dreſſings are eaſily removed at any period; ſo that, without waiting for a plentiful ſuppuration, as is commonly done, the patient may, at any time, be relieved from that diſtreſsful uneaſineſs, of which all thoſe complain, in whom the firſt dreſſings are ſeveral days in being taken away. They are always rendered ſtiff and uncomfortable, by the blood diſcharged upon them after the operation; and the matter at firſt ſecreted being thin and acrid, I have, in various inſtances, ſeen, when the dreſſings have not been removed for ſix or ſeven days, and in ſome caſes even in leſs, that the whole contiguous parts have been excoriated by the acrimony of the matter alone, and by which more uneaſineſs has been induced during the courſe of the cure, than by any other circumſtance connected with the operation: Nay, in ſome, the inflammation induced in this manner has an obvious influence

fluence on that of the teſticle, and tends to render it much more ſevere than it otherwiſe would be.

On ſome occaſions, at the firſt dreſſing, and always at the ſecond or third, the pledgets inſerted between the tunica vaginalis and teſticle come away; and whenever this happens, they ſhould be renewed. It is alſo proper to renew them daily, for the firſt fourteen or fifteen days after the operation; not, however, of the ſame depth as the firſt, as, during the latter part of the cure, it proves ſufficient, if they are merely inſerted ſo far as to prevent the divided edges of the tunica vaginalis from adhering to the teſticle before the adheſive proceſs has taken place in the parts more deeply ſeated. To this point, I muſt obſerve, the moſt particular attention is neceſſary; for, when this mode of operating fails, that is, when the diſeaſe returns, it is, almoſt in every inſtance, from this precaution being overlooked. In my own practice, the diſeaſe has not returned in a ſingle inſtance: But I have met

met with different cases in which it has done so, and in all of them from the cause I have mentioned, to wit, the divided edges of the tunica vaginalis being allowed to adhere to the testicle, before adhesion had taken place between the parts more deeply seated.

In almost every circumstance, the treatment of hydrocele by this operation is the same with what answers best in a common abscess. After opening an abscess, if the lips of the newly-divided parts are allowed too early to adhere, either to each other, or to the parts beneath, the operation will most probably fall to be renewed, as matter will thus be allowed to collect, by which the patient will be nearly in the same situation as before; while all manner of risk of this is prevented, by the cut being kept open till the sides of the abscess adhere to each other. In like manner, we never fail in the cure of hydrocele, if the external cut is kept open, not till the cavity of the tunic vaginalis fills up with granulations, as some have imagined

imagined to be neceſſary in this mode of operating, but merely till ſuch a degree of inflammation is induced upon the teſticle and vaginal coat, as terminates in their adheſion to each other.

This idea of the whole cavity of parts in this ſituation being to fill with new granulations, has been held out by ſome as an objection to this operation; and as many believe that it actually happens, I have judged it proper to ſpeak of it more particularly than thoſe will conſider as neceſſary, who have been accuſtomed to operate in this manner. No ſuch proceſs takes place: inſtead of it, the teſticle and vaginal coat, ſoon after the operation, become inflamed; till the ſixth or ſeventh day, the inflammation continues gradually to increaſe, when the whole tumor, as I have obſerved above, has acquired the uſual ſize and appearance of a common hernia humoralis from gonorrhœa. About this period, the tunica vaginalis is found to adhere to the teſtis, over all the poſterior and lateral parts of the tumor, and on the

the ſlips of oiled linen being gradually leſſened, and at laſt withdrawn, by the fourteenth or fifteenth day, or ſoon thereafter, the adheſion becomes complete; the tumor of the teſtis gradually ſubſides, and the ſore produced by the cut, and now reduced to a line, heals in a ſhorter or longer time, according to the habit of body, age, and other circumſtances of the patient. In ſome, the cure is complete in three weeks; I have known it in leſs; while, in others, it runs on to the fourth, fifth, and, in a few caſes, to the ſixth week.

Having thus given an account of the different operations uſually employed for the radical cure of the hydrocele, I ſhall now make a few obſervations on the comparative advantages of the three laſt, to wit, thoſe by cauſtic, the ſeton, and the ſimple inciſion; one or other of theſe being now commonly practiſed for the removal of this diſeaſe.

From the teſtimony of many reſpectable authors of the efficacy of each of

theſe, there is no reaſon to doubt that any of them would, in moſt inſtances, prove effectual: that the cauſtic, when properly managed, will, for the moſt part ſucceed, we have every reaſon to believe; and the ſame may be ſafely aſſerted both of the ſeton, and the ſimple inciſion; but every practitioner being apt to be prejudiced in favours of a particular method, he generally continues to practiſe that mode, and no other; and finding that it commonly ſucceeds, he by degrees comes to perſuade himſelf, that other methods of cure, with which he has not had ſuch opportunities of becoming acquainted, are liable to objections, which thoſe who have practiſed them do not find to be the caſe.

I happened to attend the hoſpitals in London, about the time that Mr Pott's publication on the ſeton, and Mr Elſe's treatiſe on the cure of the hydrocele by cauſtic, were publiſhed; when, of courſe, the various means of curing the diſeaſe were frequently the ſubject of medical converſation. I was thereby induced to

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pay much attention to the ſubject; and having the advantage of ſeeing the practice of different hoſpitals, and not being particularly biaſſed in favours of any particular method, I was thus furniſhed with the beſt opportunity that could be wiſhed for of forming an opinion: And the reſult of all the obſervation I was either at that time able to make, or ſince that period, both in the hoſpital here, and in private practice, is, that although all the three modes of operating, by cauſtic, the ſeton, and ſimple inciſion, are perhaps equally capable of producing a radical cure; yet that, of the three, the latter, to wit, the mode by the ſimple inciſion, is liable to feweſt objections, and effects a cure both with leaſt trouble to the operator, and leaſt riſk to the patient: And, of the other two, the treatment by cauſtic appears to me to be the beſt.

I have ſeen all the three produce troubleſome ſymptoms, ſuch as, pain, and tenſion of the abdomen, inflammation, and fever; but, from much obſervation, I can,

without hesitation, say, that the seton is more frequently productive of these than either of the others; nor need we wonder at this being the case; for the cord which is here introduced, lying in close contact with the body of the testis, must necessarily occasion a considerable and continued irritation, as long as it remains applied to it.

The seton is likewise attended with other inconveniencies, to which neither of the others, when properly managed, are liable. When the inflammation, which succeeds to the introduction of the cord, runs high, as it frequently does, it commonly terminates in such a plentiful suppuration, that the matter produced by it cannot be readily discharged at the opening made for the seton. In consequence of this, it finds access to the neighbouring parts; and different abscesses are accordingly formed, which must all be discharged by as many openings. This may, in part, be obviated, by making the inferior opening of the size I have directed; but,

but, in ſome inſtances, I have found even that this has not proved ſufficient, owing to the opening being reduced in ſize by the ſwelling and inflammation of the tumor.

Another objection to this operation, which I think of importance, is this: It does not admit of free examination, either of the ſtate of the teſticle, or of the fluid contained in the ſac. I know that, in a ſimple uncomplicated hydrocele, the ſtate of the teſticle requires no examination; nor would we think of removing it, either on account of a mere enlargement, or diminution of its ſize, provided it is not otherwiſe diſeaſed. But we know well, that caſes ſometimes occur, which elude the utmoſt ſkill and penetration of the ſurgeon; no diagnoſtic ſymptoms, with which we are yet acquainted, being ſufficient to direct us with abſolute certainty.

The moſt experienced practitioner will admit, that, at times, he has been miſtaken in his opinion reſpecting the nature

of ſuch tumors; a real ſarcocele, or ſchirrous teſticle, attended with ſome effuſion of a fluid, being, in ſome inſtances, miſtaken for a pure unmixed hydrocele; and, vice verſâ, a ſimple uncomplicated caſe of hydrocele has been miſtaken for, and treated as a ſchirrous teſticle. Such occurrences every practitioner muſt have met with; and, among others, who confeſs their having been deceived in this manner, a very candid acknowledgment is made of it by Mr Pott *; and Mr Elſe takes notice of a ſimilar occurrence in which he was concerned.

I have been concerned in different caſes, where the moſt experienced ſurgeons were at

* Treatiſe on the Hydrocele, p. 288. In this caſe, which, from every circumſtance, had been conſidered as a ſarcocele, the teſtis, after being removed, was found to be perfectly ſound, the diſeaſe being a real hydrocele of the tunica vaginalis.

The mere poſſibility of ſuch an occurrence with ſuch an attentive obſerver as Mr Pott, ought to ſerve as a moſt convincing argument with practitioners of the neceſſity of proceeding with the utmoſt caution in all ſuch caſes, where there is the leaſt cauſe for doubt.

at a loſs to determine the real nature of the diſeaſe; that is, whether the ſwelling in the ſcrotum was a ſimple hydrocele of the vaginal coat, or an effuſion of a fluid into that bag produced by a ſchirrous teſticle. In all ſuch caſes of doubt, the ſurgeon ſhould proceed as if the tumor was a real ſarcocele. If, on laying open the ſwelling, the teſticle is found diſeaſed, that is, if it is in ſuch a ſtate as to require extirpation, it ſhould be removed immediately; while, on the contrary, if it appears to be ſound, he will treat it as a caſe of ſimple hydrocele.

In ſeveral inſtances of this kind, where, by different practitioners, a mere collection of water was expected without any other affection, the teſticle has been found to be ſo much diſeaſed, as to render immediate extirpation proper. Now, if in ſuch circumſtances a cure had been attempted by the ſeton, the teſticle would have been allowed to remain expoſed to the irritation produced by the cord, which probably would have induced very trouble-

ſome and even alarming ſymptoms; for we know that every ſymptom of a ſchirrous tumor, is uniformly rendered worſe by irritation.

It has indeed been alleged, that the real ſtate of the teſtis may be always known, by drawing the water off from the tunica vaginalis with a trocar; and this has accordingly been recommended as a previous ſtep to the introduction of the ſeton, with a view to aſcertain the ſtate of the teſticle. But it often happens, even after all the water is drawn off, that the thickneſs produced by the vaginal coat and ſcrotum collapſing in large folds about the teſtis, precludes effectually every accurate examination of this kind. Of this, where the tumor has been large, every practitioner muſt have met with inſtances; and we need not be ſurpriſed at its being ſo, when it is known that inſtances occur, in which it requires a good deal of experience to determine, whether a teſticle is ſo much diſeaſed as to require extirpation, even when completely laid bare in the

common

common operation for the hydrocele. Of this I have known ſeveral caſes in which a difference of opinion occurred, even among ſurgeons of obſervation; and among theſe, the moſt remarkable happened in an operation performed by a late very eminent ſurgeon. The caſe was ſuppoſed to be a ſchirrous teſticle connected with the effuſion of a conſiderable quantity of a fluid into the tunica vaginalis. On laying open the tumor, the teſticle was found enlarged and hard; but being neither painful nor unequal on the ſurface, the operator thought it improper to remove it: The ſurgeons preſent were of a different opinion; but the event of the caſe, which was favourable, tended to evince the ſuperior judgment of the operator, although, previous to the operation, he had entertained a very different opinion.

I have alſo obſerved above, that when the ſeton is uſed, the contents of the cyſt cannot be properly aſcertained. It ſometimes happens, as will be more particular-

ly noticed in the next ſection, that a portion of gut is contained in the upper part of a hydrocele. Of this I have met with ſeveral caſes, in ſome of which no ſuſpicion was entertained of it, till the ſac was laid open, although in two of them the water had previouſly been drawn off with a trocar.

In other inſtances, the water of a hydrocele is contained in hydatids *; a circumſtance not to be diſcovered previous to the opening of the tumor: And as it will be readily admitted that the method of cure by ſeton is ill ſuited for diſcharging hydatids, this of itſelf is a material objection to the practice; ſo that, although the ſeton, in every other reſpect were equally eligible with the ſimple inciſion, which, for the reaſons formerly given, I think it is not, yet the three laſt objections that I have adduced againſt it, ſeem

* Thoſe who doubt of the exiſtence of hydatids in caſes of hydrocele, as ſome have done, will find different inſtances of them recorded in Morgagni de Cauſis et Sedibus Morborum.

ſeem to be ſufficient reaſons for ſetting it aſide.

With reſpect to the mode of treatment with cauſtic, I have only to obſerve, in addition to what has already been ſaid of it, that where patients are naturally timid, and do not incline to ſubmit to the operation by the knife, this may be put in practice.

But the method of cure by cauſtic is liable to one important objection, which never attends the cure by inciſion, to wit, that of being productive of ſinuſes, and collections of matter, in the ſcrotum and cellular ſubſtance connecting that bag to the tunica vaginalis. Two inſtances of this I have ſeen, in which it was neceſſary to diſcharge collections of matter by different openings; and a remarkable caſe of it is related by Douglas, in which an extenſive inciſion became neceſſary for removing the collected matter *. For this reaſon, therefore, and as the method of cure by inciſion brings the ſtate of the teſticle

* P. 105.

teſticle immediately and more completely into view, and eſpecially as, from all the experience I have had of the two different modes of operating, that by inciſion ſeems to produce the leaſt troubleſome ſymptoms, I am decidedly of opinion that it ſhould be preferred.

In points of ſuch importance, no perſon ſhould form any opinion haſtily. Nothing but various opportunities of putting the different operations in practice, can enable any one to judge of the merits of each. Even in the writings of the late celebrated Mr Sharpe, we find a remarkable inſtance of this. In his treatiſe on the operations of ſurgery, he ſpeaks of the radical cure of hydrocele, whether by cauſtic or inciſion, or in whatever way it is done, as a very dangerous operation, and ſeems to think that it will be entirely laid aſide *.

At that time it is evident that Mr Sharpe's experience in this diſeaſe was not ſufficient to warrant a deciſive opinion. It

* Tenth edition, Chap. IX.

It proved to be contrary to the direct experience of some of our best surgeons; and Mr Sharpe himself seems afterwards to have been convinced that his first ideas of it had been ill founded *. Still, however, his first opinion had much influence with a great proportion of surgeons; so that, till of late years, the radical cure of hydrocele was seldom attempted but in large hospitals: And when at last it was found that the danger attending it was less than had been represented, still, the terror induced by Mr Sharpe's account of the mode of operating by incision, was such, that almost all who wrote upon it, were afraid of advising it to be so generally performed as it ought to be.

When the earlier editions of this work were published, although I gave the same opinion of this operation that I have now done, and of the preference to which it appeared to be entitled, and although my experience of its utility and safety had at that time been considerable, yet, finding it

* Vide Critical Inquiry, first edition, p. 86.

it ſpoken of with much caution by many, and among others by Mr Pott, I did not venture to recommend it ſo warmly for general uſe, as I am now by much additional experience enabled to do. Although I had performed the operation in a great number of caſes, without loſing a patient, yet, as in ſome the inflammation came to a conſiderable height, I was afraid that in others the dreadful accounts that were given of it by authors might occaſionally be realized. This induced me not only to ſpeak of it with caution, but to endeavour, if poſſible, to diſcover the cauſe of the violence of this ſymptom; for it obviouſly appeared, not merely from my own obſervation, but from all the accounts which had been given of this operation, that the danger attending it was always in proportion to the degree of inflammation; and therefore, if this could be rendered moderate, that little or perhaps no hazard would enſue from it.

I did not find that the length of the inciſion had much influence; for, whether

it was to the full extent of the tumor, or only to one-third of that length, the inflammation appeared to be the same. Some advantage indeed was derived from attending to the direction of the incision; for, wherever it was carried too near the testicle, as is sometimes done at the bottom of the sac, the pain and inflammation were always severe; but the most frequent cause of the violence of these symptoms appeared at last to be the mode of dressing the parts after the operation. It had commonly been the practice to cram a considerable quantity of dressings into the cavity of the tunica vaginalis; and, with a view to make the surface of the parts slough quickly off, a process which at that time was judged necessary for the cure, red precipitate and other irritating substances were made use of by many. The impropriety of these being obvious, dry lint was, by Mr Pott and others, proposed to be used instead of them. This was an important improvement, and it tended more than any other circumstance

to

to leſſen the dread that had been conceived of this operation by the writings of Mr Sharpe. Still, however, the inflammation run in many inſtances too high; the parts ſwelled to a great ſize, and the patient, for the firſt two or three weeks of his confinement, was often kept in much diſtreſs and anxiety.

Having frequently found that the dry lint inſerted into the tunica vaginalis, adhered, at the firſt dreſſing of the parts, ſo firmly to the ſurface of the teſtis, that it could not be withdrawn, I at laſt began to conclude that this might render the inflammation more ſevere than it otherwiſe would be; and it ſoon appeared that my conjecture was well founded. For ſeveral years paſt I have covered the pledgets applied to the ſurface of the teſtis, as has been adviſed above, either with fine oil, or with a thin liniment of oil and wax, which anſwers better. This gives much leſs pain, in the firſt inſtance, than dry lint, and the pledgets never adhere to the contiguous parts; ſo that they can

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be as easily removed at the first dressing of the sore, as at any future period of the cure.

The effect of this, and of proceeding in the other parts of the treatment, in the manner I have mentioned, has been, that during all this period the inflammation has never gone farther than I could have wished it to do; never so far as to excite the least cause of anxiety. The testicle swells and inflames, but in no greater degree than is necessary for preventing a return of the disease. Of this the clearest proof that can be given, is, that of upwards of one hundred and fifty patients on whom I have operated in this manner, I have only once found it necessary to advise blood-letting; and very rarely, as I have formerly observed, fomentations or poultices.

I may further mention one important advantage of this operation, in addition to what I have said of it, that it may be considered as absolute security against a return of the disease. I have known indeed

deed two inſtances, and I have heard of other two, in which the diſeaſe returned after this operation was performed. But theſe are all the inſtances I can hear of its failure in the courſe of theſe laſt twenty-five years; and in all of them the cauſe was evidently traced to want of that perſevering attention during the cure, ſo neceſſary for the ſucceſs of every operation, and particularly for that of the hydrocele.

That this operation is not hazardous, and that it may with confidence be relied on againſt future returns of the diſeaſe, I am warranted in aſſerting, not only from the univerſal ſucceſs attending it in this country with others, but from the ſucceſs ariſing from it in my own practice.

Almoſt every operation that had been propoſed for the cure of hydrocele, had, by one or other of our ſurgeons, got a fair trial; to wit, that by exciſion, or cutting away the greateſt part of the tunica vaginalis; by injecting wines and other liquids into the cavity of the ſac; by irritation,

ritation, excited with tents of various kinds, both ſolid and hollow; and more lately by the ſeton. But, however keenly one and all of theſe methods had for a time been ſupported by thoſe who firſt introduced them, they were at laſt entirely laid aſide; ſo that, for theſe laſt five years and more, ſcarcely any has been attempted through the greateſt part, or perhaps the whole of Scotland, but that by inciſion: And although, as I have obſerved above, I have been able to trace a return of the diſeaſe in four inſtances, all of them from cauſes which ought not to have occurred, not one, ſo far as I know, has died of the operation.

I have now performed this operation in a very large number of caſes, and in every variety of age, from the third to the ſeventy-fifth year: Not one of the number has either died or been in danger; nor has the diſeaſe returned in any of them. In various inſtances, at firſt, the inflammation, as I have obſerved above, arrived at a conſiderable height; but not

in a ſingle inſtance, ſince the operation has been done in the manner I have mentioned.

I have therefore no reaſon to doubt of the objections which have been made to this operation, being ſoon done away, and I alſo believe, that the more it is put in practice, the leſs dread will be entertained of it. For my own part, I now conſider it as a matter of nearly the ſame ſimplicity as the treatment of a common abſceſs in any part of the body. The cure is conducted upon the ſame principles. It is accompliſhed in the ſame time; commonly in leſs than the cure of abſceſſes of equal magnitude; and, from the event, I am warranted to ſay, that it is not attended with more hazard.

Others, from not being ſo fortunate, and with whom a high degree of inflammation was often induced, not conceiving that this inconvenience could be leſſened, either by any alteration to be made in the mode of performing the operation, or in the management of the dreſſings, were naturally

naturally induced to make trial of other means of obtaining a radical cure of the disease.

The late Mr James Rae of this place, who was perhaps one of the best-informed practitioners, as I believe him to have been one of the best operators of the age, was, I believe, the first who revived the use of the seton in this kingdom for the cure of the hydrocele. He, as well as Mr Pott, who afterwards wrote upon it, having, from the causes I have mentioned, conceived a dread of the mode of operating by the simple incision; and Mr Rae having previously made many unsuccessful trials of the method of cure by injecting wine and other liquids into the tunica vaginalis testis, they both keenly adopted the practice with the seton. Being strongly recommended by two surgeons of such reputation, it was at first adopted by others; but the inflammation induced by it was found, in some instances, to be so great and alarming, and the distress arising from matter collecting within

in the tunica vaginalis, and from the openings neceſſary for the diſcharge of it, was ſo conſiderable, that the practice never got into general uſe; and it now appears to be laid aſide even by thoſe who at one period had formed the moſt favourable opinion of it. I have not heard of its being performed in a ſingle inſtance in this place, for theſe laſt twenty years: it ſeems to be falling into diſuſe in England; and although in ſome parts of the Continent it was at firſt adopted, on the recommendation of Mr Pott, I do not now learn that it is ever attempted.

About the ſame period that Mr Pott wrote upon the uſe of the ſeton, the late Mr Elſe began to revive, with ſome improvements, the method of curing the hydrocele with cauſtic; and if any ſufficient reaſon had occurred for laying aſide the operation by the ſimple inciſion, I would have been of opinion that the method of cure recommended by Mr Elſe, ſhould have been preferred to every other with which we are yet acquainted. It gives much

leſs

leſs pain than the ſeton, and it cures the diſeaſe with equal certainty.

The method of cure by exciſion, that is, by cutting away the tunica vaginalis, cannot be compared to that by the ſimple inciſion; for it does not accompliſh a cure more quickly, nor with more certainty, while it obviouſly renders the operation much more tedious and more painful, the chief reaſons, no doubt, for this mode of operating being now very generally exploded.

The laſt variety of operation that has been recommended for the cure of hydrocele, is alſo the revival of an old one, to wit, the injecting of wine and other liquids into the tunica vaginalis teſtis.

The merit of firſt propoſing the cure of this diſeaſe by injections, has commonly been given to a Mr Munro, a ſurgeon of this country; but we now have evidence of the practice having been propoſed and adopted upwards of fifty years ſooner. Tents, armed with irritating ointments, having long been employed, we need not

wonder at injections being confidered as a better method of conducting the fame remedies to the parts upon which they were to act. Whether injections were earlier ufed for this purpofe or not, we do not certainly know; but in 1677, there is a third edition of what is intituled Les Oeuvres Chirurgicales, of a Monfieur Lambert at Marfeilles, in which a particular account is given of the method of curing hydrocele by injections. The liquid Mr Lambert preferred, was a ftrong folution of corrofive fublimate, in lime-water; and he enumerates many cafes in which it proved fuccefsful. But whether from the pain which it excited being fevere, or for other reafons with which we are not acquainted, this mode of operating appears to have been for a long time laid afide, till it was afterwards practifed by Mr Munro. Mr Munro at firft made ufe of fpirit of wine; but although it cured the difeafe, the pain which it excited was fo fevere, that he immediately laid it afide, and employed wine inftead of it.

The

The practice being favourably received by ſome of the firſt ſurgeons of this place, particularly by the late Dr Monro, Mr Douglas, Mr Lauder, and the late Mr Rae, it was for ſome time frequently practiſed, eſpecially by Mr Douglas and Mr Rae. The liquids they employed were diluted ſpirit of wine, lime-water, a ſolution of alum, and red wine, both by itſelf, and diluted.

But however favourably they were at firſt induced to judge of the practice, and although very anxious for its ſucceſs, it was, in the courſe of a few years, laid aſide by all of them, and evidently upon good grounds. The injection either excited ſevere pain, on being firſt thrown in, and was ſucceeded by violent inflammation, and this, in ſome, by diſtreſsful collections of matter; or the cure did not prove permanent. In a few caſes, the diſeaſe returned almoſt immediately, that is, in the courſe of two or three weeks; but this was not frequent. For the moſt part, the cure appeared to be complete, and con-

tinued to be ſo, till at ſome diſtant period, to the great diſappointment both of the patient and ſurgeon, a recurrence of the ſwelling was obſerved. In ſome, this happened in five or ſix months; in others, not till three or four years had elapſed.

About the ſame period, ſome unſucceſsful trials being made with injections in London, both by the late Mr Sharpe and others, the practice was altogether laid aſide there, as it had been here, till of late that ſome attempts have been made to revive it.

But although for a period of more than forty years, this operation was ſcarcely heard of in Britain, it was frequently practiſed in France, and other parts of the Continent, where many trials and experiments were made for curing the hydrocele by injections. Trials were made with ſpirit of wine, both by itſelf, and diluted with water; with a ſolution of common cauſtic in water, in the proportion of two grains to the ounce; with blue vitriol in water, in the ſame proportions; with lime-

water,

water, both by itſelf, and with mercurius ſublimatus corroſivus diſſolved in it in various proportions, from a quarter of a grain to two grains, to the ounce; with ſtrong ſolutions of alum, of ſaccharum ſaturni, infuſions of red roſe leaves, infuſions of oak bark, and with red wine, both by itſelf, and reduced with water to various degrees of ſtrength, according to the fancy of the operator.

Many give the preference to an infuſion of red roſe leaves: Others make uſe of the corroſive ſublimate; but it requires, even when much diluted, to be uſed with great caution. In general, the preference is given to wine: When claret or burgundy are employed, they are commonly mixed with a ſixth or ſeventh part of water; and when port is uſed, a third or fourth part of water is added. Where no pain is excited by the injection thus diluted, the liquid ſhould be diſcharged, and pure wine thrown in; for where no pain takes place, a cure is not to be looked for.

The

The operation is done in different ways; ſome preferring a lancet for making the opening into the tumor, and others injecting the liquid with a common ſyringe; but in my opinion, the beſt method of performing it is the following.

The ſurgeon ſhould be provided with a flat trocar, of the form and ſize repreſented in Plate LXVI. fig. 3. together with a bag of reſina elaſtica, fitted with a pipe, repreſented in the ſame plate, fig. 1. The pipe ſhould be ſomewhat longer than the canula of the trocar, ſo as to paſs about an eighth part of an inch beyond it. If longer than this, it might injure the teſtis; and when ſhorter, the liquid does not paſs ſo eaſily. The quantity of liquid to be injected ſhould be gently warmed, and put into the bag before the operation is begun. The patient being laid in a horizontal poſture, either upon his bed or on a table, and ſecured in the uſual way by aſſiſtants, the water ſhould be drawn entirely off from the tumor, by paſſing the trocar into the anterior, and moſt depending part of it.

The

The operator, ſecuring the canula of the trocar with his left hand, is now, with his right, to paſs the tube of the injection bag entirely through it, and with gentle preſſure, to force as much of the liquid which it contains into the cavity of the tunica vaginalis, as may be neceſſary for eaſily reaching every part of it, as well as the whole ſurface of the teſtis. The bag ſhould now be removed, taking care to leave the tube within the canula of the trocar, ſo that, by turning the ſtop-cock, the liquid may be retained in the cavity of the tumor. The ſurgeon ſhould ſtill keep the canula of the trocar fixed, otherwiſe it might recede, by which the liquid would inſinuate into the cellular ſubſtance of the ſcrotum, and in this manner do harm. He ſhould alſo, with very gentle preſſure, make the liquid paſs to every part of the cavity during the time it is retained in it; and, at the end of four minutes, it ſhould be entirely diſcharged through the canula of the trocar, after withdrawing the tube of the elaſtic bag.

Some

Some have ſaid that the injection ſhould be retained about three minutes: Others think that it cannot be depended on in leſs than ſix or ſeven. But thoſe who have operated moſt frequently in this manner, are of opinion, that the ſpace of four minutes is better than either. It ſometimes happens, that intenſe pain is given almoſt inſtantaneouſly on the injection being introduced. In this caſe, it ſhould be diſcharged as ſoon as it has been made to paſs to the different parts of the tunica vaginalis.

Some again are of opinion, that, after the quantity of liquid firſt injected is diſcharged, a ſimilar quantity ſhould be immediately thrown in, and retained for the ſame length of time, and that the operation will be very apt to fail, if this is omitted. This, however, is ſeldom done, although, I believe, it would be a real improvement on the operation.

The quantity of liquid to be injected, ſhould always depend on the ſize of the tumor. Some have thought that it ſhould be

be equal to the quantity drawn off by the operation; but this does not appear to be neceſſary, while the injecting of ſuch a quantity is apt to do harm. After having collapſed completely, the parts do not again yield eaſily to ſudden diſtention; ſo that violent pain has been induced by it. Where the tumor is ſmall, that is, where only five or ſix ounces of ſerum are collected, the quantity of injection need not exceed three or four ounces; while it ſhould not be leſs than ſeven or eight ounces, where a pound of ſerum has been drawn off; and in this proportion, according to the ſize of the tumor.

Leſs than any of theſe quantities might anſwer; but it would require more handling to bring it into contact with all the parts which it ought to touch; and, as a larger quantity is eaſily introduced, it ſhould always be adviſed.

On the injection being diſcharged, and not a drop ſhould be left, the ſcrotum ſhould be covered with a pledget of common cerate, a compreſs being applied over it,

it, and retained with a ſuſpenſory bag. The patient ſhould be deſired to remain in bed for ſeveral days, and to give aid to the ſuſpenſory bandage, by inſerting a ſmall pillow beneath it.

It often happens, that the pain is inconſiderable from the firſt; ſcarcely any inflammation or tumor being perceived on the teſtis; and the patient, conſidering himſelf as well, walks abroad, in ten, twelve, fourteen, or fifteen days. But, with others, a very ſevere degree of pain takes place on the firſt introduction of the injection, not merely in the teſtis, but in the back, and over the whole loins. In moſt inſtances, this ſoon becomes moderate, and the treatment goes eaſily on; but, in others, it is ſucceeded by great inflammation in the teſtis and ſcrotum; and, in a few, this terminates in collections of matter within the cavity of the tunica vaginalis.

Theſe violent ſymptoms the practitioner endeavours to obviate by blood-letting, a low diet, the uſe of laxatives, and all the

the remedies usually employed in hernia humoralis; such as all the saturnine applications; and warm emollient fomentations and poultices, when suppuration is likely to take place.

When matter forms in the tunica vaginalis, the treatment consists in laying the collection open from one end to the other, and conducting the cure, as has already been advised in the operation by the simple incision. The formation of matter, I believe, is not frequent; but I know that it occasionally happens; and so much are the practitioners on the Continent afraid of it; of the height to which the inflammation might otherwise advance; and of the dreadful distress that in such circumstances ensue, from suppuration taking place, that they seldom perform the operation without premising purging and blood-letting, and often repeat the blood-letting once and again during the cure, precautions never judged necessary in the method of curing the hydrocele by the simple incision.

The proportion of thoſe that are radically cured by this method of operating, it is difficult to aſcertain; for, although in ſome the diſeaſe returns in the courſe of two or three weeks; in others, it is not perceived for ſeveral months; and, in ſome, as I have obſerved above, not till two or three years have elapſed. Hence, in hoſpital practice, where patients are ſeldom heard of after being diſmiſſed, the point in queſtion cannot be determined; and it is chiefly in foreign hoſpitals that hitherto this operation has been performed. From the beſt information that I have been able to procure, it appears, that although, in many, a complete cure is obtained, yet that the diſeaſe returns early, that is, in the ſpace of a few weeks, in a ninth or tenth part of all on whom the operation is performed; and in five of eight or nine, at ſome uncertain period in future.

Under this conviction, I have judged it proper to ſtate all that has come to my knowledge of what relates to this operation;

tion; and I am the more induced to it, from finding that others, either from an unneceſſary dread of the operation by the ſimple inciſion, and which I conſider as the beſt and moſt rational that is yet known, or from a miſrepreſentation in the accounts they may have received of the method of cure by injection, are again endeavouring to introduce it in Britain.

From the hiſtory that I have given of the method of curing the hydrocele by injections, the concluſion that I have formed of it would readily be drawn by any one; but, in addition to this, many powerful arguments may be adduced againſt it.

1*ſt*, We do not, from experience, find, that other tumors, produced by fluids contained in cyſts, are readily cured by injections. Few, I believe, would now think of attempting the cure of abſceſſes or encyſted tumors by injections. In tumors induced by fluids collected in the burſæ mucoſæ, where, from the contiguity of joints, extenſive inciſions might have done harm, I have in various inſtances,

 made

made trial of injections; but seldom with any advantage. In some, they excite pain and inflammation; and where this does not happen, although they may lessen the discharge, this proves only temporary; so that a cure is afterwards to be obtained by the introduction of a cord, or the enlargement of the opening to as great an extent as with safety can be ventured upon.

Mr Earle, indeed, has said, and he gives it as a reason for the practice he has adopted in hydrocele, that he has frequently succeeded in procuring adhesion and consolidation of parts in sinuses, *and other large cavities*, by injections of various kinds: But, as this has neither happened in the course of my own experience, nor with any other practitioner with whom I am acquainted, I must leave the practice in the hands of those with whom it has answered better.

At one period, a practitioner in this country got into notice, by announcing frequent cures of the fistula in ano as well as other sinuses, by injections. Some timid patients,

patients, both here and from England, put themſelves under his care. His reputation, however, was not of long duration; for I do not find that he proved ſucceſsful in one of twenty caſes, although the patients commonly remained long under his care. The injections were thrown in frequently, and with much attention; and liquids of various kinds were employed; ſome that ſeemed to act ſolely by their aſtringency, and others by exciting inflammation.

2*d*, When the tunica vaginalis has been much diſtended, as it will not collapſe equally round the teſticle on the fluid being drawn off, cavities will thus be formed, by which ſeparate collections will be apt to take place, either of a ſerous fluid, or of purulent matter, if inflammation has been excited. This was my opinion of the probable effect of injections, long before the laſt edition of this volume was publiſhed; and ſince that period, different caſes have occurred, which render it certain that the ſuſpicion was well founded.

3*d*, When inflammation, excited by an injection, goes too far, and with whatever care the operation is done, it ſometimes happens, the diſtreſs produced by it is ſevere. Beſides the pain ariſing from the inflammatory ſtage of the diſeaſe, if ſuppuration takes place, the patient muſt ſubmit to that painful diſtention which the ſudden formation of matter in this confined ſtate always excites; to the febrile ſymptoms with which it is attended; and to an inciſion equally extenſive for diſcharging the matter, as if the mode of cure by inciſion had been adopted at firſt.

4*th*, The ſtate of the teſtis cannot, in this mode of operating, be examined with the ſame accuracy, as when the operation is done by inciſion. Hence it may be in ſuch a ſtate of diſeaſe as to be injured by the injection, without our being previouſly able to diſcover it.

Some indeed have ſaid, that, on the water being drawn off, we may always know with certainty whether the teſticle is ſound or not. This when it is much enlarged,

larged, is certainly the case; but where the tunica vaginalis is thickened, as it generally is when it has been long much distended, the testis, if not considerably enlarged, as well as the epididymis, may be materially diseased, without our being able to discover it. Of this I have seen various instances; in some of which, as I have observed above, practitioners of much experience were deceived.

5th, The views of modern surgeons in the cure of the hydrocele, are, as I have already had occasion to remark, to excite such a degree of inflammation over the surface of the testicle, as well as of the tunica vaginalis, as may produce a firm adhesion between them.

Now, instances often occur, in which the tunica vaginalis is so thick, callous, and insensible, that a much more irritating injection would be required to make it inflame than the testicle itself can bear.

Nay, cases are sometimes met with, in which different portions of the tunica vaginalis are as firm and hard as cartilage;

a ſtate highly improper for any attempt to cure the diſeaſe by injections, or in any other way than by removing the hardened parts; and yet this ſometimes happens, as I have more than once ſeen, where previouſly it could not be diſcovered, and in which the tunica vaginalis teſtis appeared to be in its uſual ſtate, till the contrary was found to be the caſe, on laying the parts open by ſimple inciſion.

6th, The chief, and perhaps only advantage which the mode of operating by injection ſeems to poſſeſs, over that by inciſion, is, that it is leſs painful in the execution; but although this may be a reaſon for adviſing it with timid patients, who will not ſubmit to the other, it is not ſufficient to warrant practitioners in giving it the preference. The prevention of pain is at all times a moſt deſirable object; but it is far from being the only one in chirurgical operations. Our chief view, is the ſafety of our patient in the firſt inſtance, together with his complete ſecurity againſt a return of the diſeaſe. In ſo far as one mode

mode of operating is leſs painful than another, and attended with equal certainty in ſecuring againſt a relapſe, it ought certainly to be preferred; but this is, as I have already had occaſion to remark, far from being the caſe with the mode of curing the hydrocele by injections: So that patients treated in this manner, are, for a conſiderable time, liable to all the diſtreſs and anxiety, which uncertainty in points of importance in every inſtance gives, while the chief difference between it and the method of operating by inciſion, which I have ſhewn to be attended with complete ſafety as well as ſecurity, conſiſts in the degree of pain which it excites being leſs. This of itſelf would have little influence even with the moſt timid, were they to know, that, in the mode of operating by inciſion, the cutting part of it is done in leſs than a minute; when the dreſſings are properly conducted, that the teſticle does not inflame more than is neceſſary for a cure; and that the ſubſequent pain is for the moſt part inconſiderable; not to be com-

pared with what is experienced from matter collecting within the cavity of the tunica vaginalis, as ſometimes happens in the mode of operating by injection, as well as in that by the ſeton.

7th, As an argument in favour of this operation, it is ſaid, that when it fails, we ſtill have it in our power to perform it over again, or to adviſe the radical cure by inciſion. This, however, leads to much vexation, diſtreſs, and diſappointment in the firſt inſtance, while I think it probable, that one effect of injections, when they do not ſucceed, muſt be to render any other operation that may be afterwards performed more uncertain than it otherwiſe would be, or to require a higher degree of inflammation to be induced. Some have imagined, that injections in the cure of hydrocele prove uſeful, only in ſo far as they excite inflammation, and conſequent adheſion of the tunica vaginalis to the ſurface of the teſtis; whilſt others are of opinion, that they act ſolely by their aſtringency. By ſtrengthening or corrugating the ſecreting

ting and abſorbent veſſels of the parts, they may be ſuppoſed to act both by preventing a too plentiful ſecretion of the fluid naturally contained in the tunica vaginalis, and by promoting a more equal abſorption; and we accordingly find, that ſuch fluids only are now uſed for theſe injections, as are in a conſiderable degree aſtringent, ſuch as infuſions of red roſe leaves, ſolutions of alum, and red wine.

My own opinion is, that a permanent cure is never to be depended on, where inflammation is not induced ſufficient to produce a firm adheſion between the tunica vaginalis and teſtis; but there is reaſon to think, that this ſeldom takes place from injections; and I conclude that it is ſo, not only from the trifling degree of pain which, in moſt inſtances, the injections now uſed commonly give, and from the ſwelling of the parts, which uſually takes place, being inconſiderable, but from the diſeaſe often returning, after it had been ſuppoſed to be cured, and which could not

not happen, if theſe parts had been made to unite by inflammation.

Now, if this is the fact, and I firmly believe it to be ſo, that injections, in a great proportion of caſes, act chiefly by their aſtringency, and not by deſtroying the cavity of the tunica vaginalis, they may readily be ſuppoſed to render, not only the tunica vaginalis, but even the ſurface of the teſtis more callous than it was before, by which a greater degree of inflammation will be required, than might otherwiſe be ſufficient, when any other operation becomes neceſſary for a permanent cure.

In anſwer, however, to all theſe objections, it may be ſaid, that the practice has already gained ground in ſeveral parts of the Continent, and that Mr Earle, a ſurgeon of our own country, has brought forth two publications on the ſubject, in both of which it is recommended in the warmeſt manner, and a number of caſes recited, in which it appears to have proved ſucceſsful.

To

To this I ſhall only obſerve, what I have already had occaſion to do, reſpecting the practice of foreigners in the hydrocele; that, having been later than the Britiſh ſurgeons, in acquiring a knowledge of the true nature of the diſeaſe, they have hitherto remained behind them in every thing that relates to it. Their practice has therefore been timid, changeable, and indeciſive. This, however, I only mean as a general obſervation; for ſome foreigners there are, whoſe knowledge in this, as in all other diſeaſes, would do them much honour: But all who have read what in general has been written upon this ſubject by foreign ſurgeons, or who have had opportunities of ſeeing their practice, muſt admit, that in the treatment of hydrocele they ought not to be followed.

And again, with reſpect to the obſervation of Mr Earle, I need only obſerve, that this writer obviouſly labours under a deep-rooted prejudice againſt every mode of operating, except that by the ſeton, of which he once ſeems to have entertained

a very high opinion, and the mode of cure by injection, which he has now very keenly adopted. In one part, indeed, of his treatise, he makes the following candid declaration: "I must confess, that I "took *an early* and *deep-rooted* dislike to "the cure of hydrocele by incision *." Labouring under this kind of terror at other operations, and disappointed, as it would seem, in his expectation of the operation by the seton, he was thus ready to adopt the practice of curing the disease with injections, in the easy manner represented by the French, and which he has accordingly with great zeal done.

If longer experience, and farther improvement, shall evince the mode of curing the hydrocele by injections to be equally safe and certain with that by the simple incision, and shall obviate the objections that I have stated against it, none will be more ready to adopt it than I shall be. In the

* Vide A Treatise on the Hydrocele, &c. by *James Earle, Esq;* p. 30.

the mean while, and in the preſent ſtate of our knowledge, few practitioners will adviſe it, if it be not with thoſe patients whoſe timidity precludes the more certain and equally ſafe method of cure, the operation by inciſion.

SECTION IV.

Of the Hydrocele of a Hernial Sac.

WHEN the parts have been long protruded in hernia, a ſerous fluid collects in the bottom of the ſac. In the ſcrotal hernia, if this extravaſated ſerum is not ſoon removed by abſorption, the tumor, we may eaſily imagine, may augment to ſuch a ſize as to afford many of the uſual marks of a hydrocele. Accordingly, beſides different inſtances that I have now met of it in my own practice, a number of caſes, I find, are enumerated by authors, which ſufficiently warrant the inſertion of this as a real, and perhaps not an unfrequent, variety of the diſeaſe.

It was well known to the ancients, that a conſiderable quantity of a fluid is frequently

quently contained in the ſac of a hernia, along with the parts protruded from the abdomen; but Saviard ſeems to have been the firſt who ſpeaks of it with preciſion. Le Dran relates different caſes of it: Heiſter ſpeaks of it under the title of Hydro-entrocele; and the late Dr Monro deſcribes it with his uſual accuracy, and mentions a caſe of it where ſix pounds of water were evacuated from the tumor, by an opening made with a trocar *. A caſe of it is alſo related by Douglas †, and two caſes of a ſimilar nature are mentioned by Mr Pott ‡.

The ſerum is here confined in a cyſt, formed by a proceſs of the peritonæum; and, as it occupies nearly the ſame ſituation in the ſcrotum with the hydrocele of the tunica vaginalis, ſo we cannot always, by the feeling alone, mark the difference between them. For, although the teſticle, in this variety of hydrocele, is commonly

* Monro's Works, p. 579. † P. 182.

‡ Treatiſe on the Hydrocele, p. 21.

monly diſtinguiſhed more evidently at the lower and poſterior part of the ſwelling, than in the hydrocele of the vaginal coat, yet, the difference in this particular between the two diſeaſes, is not always ſo evident as to afford ſufficient means of diſtinction.

When a portion of gut, and other parts forming a hernia are down, the fulneſs they produce along the ſpermatic cord, ſerves, in ſome meaſure, to diſtinguiſh the diſeaſe from a ſimple hydrocele. And when, along with this and other ſymptoms of hernia, we evidently diſcover, in the tumor of the ſcrotum, a fluctuation of a fluid, if this fluid can, by preſſure, be made to diſappear, either entirely or in part, the nature of the caſe becomes thereby obvious.

This variety of hydrocele may take place as readily in the hernia congenita, as in any other rupture; and, in that event, the water muſt be contained in the ſame ſac with the teſticle and protruded inteſtines.

As

As all the fluid indeed naturally secreted for keeping the surface of the abdominal viscera moist, must, in a congenital hernia, fall into the sac, we would be induced to suppose, that almost every hernia of this kind should be complicated with a hydrocele of the sac. The two cases of this, related by Mr Pott, appear to have been connected with hernia congenita; and I have met with it in different instances. But whether this commonly happens or not, further observation must discover.

With whatever hernia this kind of hydrocele is connected, if the water can, by pressure, be made to pass into the abdomen, this will always prove certainly characteristic of the disease; for, in no other species of encysted hydrocele, can the water be made to disappear by pressure. It may happen, however, in this kind of hydrocele, that this distinguishing symptom of the disease does not exist; for if, by the pressure of a truss, or any other cause, an adhesion is produced in the groin, between

the ſides of the hernial ſac, if the under part of the ſac continues open, with water collected in it, the tumor produced by it will afford all the uſual appearances of hydrocele, while no part of its contents can be made to paſs into the abdomen by preſſure. A caſe of this kind we find related by Le Dran, where the neck of the hernial ſac was ſhut completely, and a hydrocele formed in the under part of it.

In this ſituation, the chief means of diſtinction are to be obtained from an acquaintance with the previous hiſtory of the caſe. When, in an ambiguous caſe, it is found, that, before the water began to collect in the ſcrotum, the patient had been liable to a hernia of the ſame ſide, this circumſtance alone will tend much to determine the nature of the diſeaſe. But even although a miſtake ſhould occur, and although a hydrocele of a hernial ſac ſhould, in ſuch circumſtances, be miſtaken for a ſimple hydrocele of the tunica vaginalis, nothing bad could enſue from it; for the treatment adapted to one

variety of the diseafe, would apply with nearly equal propriety to the other; for here we conclude, that the parts which at first formed the hernia are reduced, and that the fides of the fac, in the upper part of it, adhere firmly together.

But, when the protruded parts ftill remain down, unlefs the operation for the bubonocele is at the fame time to be performed, no other fhould be attempted, but that of difcharging the water with a fmall trocar, when the fize of the tumor renders it proper. For, unlefs the operation for the hernia fhould be done at the fame time, much harm might enfue from expofing the bowels fo much to the air, as would neceffarily be the cafe, by laying the tumor open for a radical cure of the hydrocele.

Whenever it is refolved, in this variety of hydrocele, to operate for a radical cure, the fimple incifion ought unqueftionably to be advifed; as, from the rifk of injuring the bowels protruded from the abdomen, neither the feton, cauftic, nor injec-

tions, are here admiſſible. Indeed, this of itſelf affords a powerful argument in favour of the method of operating in every inſtance by the ſimple inciſion, which brings all the parts concerned in the diſeaſe into view. The very poſſibility of a patient being killed, by a ſeton paſſing through a portion of inteſtine contained in a hydrocele, is a weighty objection againſt the ſeton being ever employed; and every practitioner muſt acknowledge, that when the ſpermatic proceſs along the groin is much diſtended, and the vaginal coat of the teſtis much thickened, that ſuch uncertainty often occurs, as to render it impoſſible for the moſt ſkilful ſurgeons to determine with preciſion, what the contents of ſuch ſwellings really are. In the inſtances to which I allude, of a hydrocele connected with a congenital hernia, and which I met with ſome years ago, there had not been previouſly any cauſe to ſuſpect the real nature of the caſe. They were, by ſkilful practitioners, judged to be collections of water in the tunica vaginalis,

ginalis, without any complication whatever; and, on the tumor being laid open, together with water in contact with testicle, a piece of intestine was found protruded into the upper part of the scrotum. In one of the cases too, a small portion of omentum accompanied the gut.

In this last, it had been proposed, at a consultation of surgeons, to employ the seton. For some reason or other, this was fortunately rejected; for, on laying the tumor open by incision, it evidently appeared, that if a cord had been introduced, it must in all probability have passed through the protruded gut.

SECTION V.

Of the Anasarcous Hydrocele of the Spermatic Cord.

IN the anatomical deſcription given in the firſt ſection of this chapter, it was obſerved, that ſoon after the deſcent of the teſtis, the paſſage along the ſpermatic proceſs of the peritonæum, is completely obliterated, by the ſides of the paſſage adhering together.

By external preſſure, and in ſome inſtances, perhaps from other cauſes, this adheſion of the ſides of the peritoneal proceſs, is in general very firm in that part of it which paſſes along the groin; but the ſuperior and more internal part of the proceſs, is not only more looſe in itſelf, but is connected with, and enveloped in a very looſe cellular ſubſtance.

From

From this cellular ſtructure of theſe parts, we might, à priori, ſuppoſe them to be liable to the ſame kind of anaſarcous or œdematous ſwellings, with which other parts of the body, of a ſimilar ſtructure, are frequently attacked; and accordingly, we find that this is the caſe. This anaſarcous ſwelling ſometimes accompanies aſcites; and it now and then appears locally, without being combined with either of theſe.

The cauſes of this variety of hydrocele in general, are, obſtructions produced in the lymphatics, leading from the part, by ſcirrhous affections of the liver, ſpleen, and other abdominal viſcera. I have likewiſe known it induced by the preſſure of a truſs applied for the cure of a hernia *.

When the ſwelling is connected with anaſarca in other parts, it is thereby ſo diſtinctly marked, as to render a particular deſcription of it unneceſſary. When it takes places as a local diſeaſe, its ap-

* An inſtance of this is alſo mentioned by Douglas. Treatiſe on the Hydrocele.

pearances are theſe: A colourleſs tumor in the courſe of the ſpermatic cord; ſoft and inelaſtic to the feel, and not attended with fluctuation. In an erect poſture, it is of an oblong figure, but when the body is in a recumbent poſture, it becomes flat. It does not commonly occupy more than the uſual ſtretch of the cord along the groin, but occaſionally, it extends down the length of the teſticle, and even ſtretches the ſcrotum to an enormous ſize *.

By preſſure, the ſwelling can be always made to recede, never entirely, but often in great part, into the cavity of the abdomen. It inſtantly, however, returns to occupy its former ſituation on the preſſure being withdrawn.

When the tumor is connected with general anaſarca, unleſs the cauſe which gave riſe to the diſeaſe of the conſtitution is removed,

* A remarkable inſtance of this is related by Mr Pott, who, from a ſwelling of this kind, diſcharged eleven Engliſh pints at once. Treatiſe on Hydrocele, caſe x.

moved, it would be a vain attempt to endeavour to cure this particular ſymptom. And it commonly happens, that theſe ſwellings in the groin, ariſing from anaſarca, diſappear when the diſeaſe of the ſyſtem is carried off.

But when the ſwelling occurs as an original diſeaſe, produced, perhaps, by ſome local cauſe; a local remedy is then the beſt means we can employ. In this caſe, as we have not the general bad habit of body to encounter, which commonly occurs in ſcrotal anaſarca, we need not be ſo much afraid of making a free inciſion into the tumor; and accordingly, all that is neceſſary to be done is this: As ſoon as the tumor has acquired ſuch a ſize as to become inconvenient, an inciſion ſhould be made with a ſcalpel from one end of it to the other, taking care to go ſo deep, as effectually to diſcharge all the fluid contained in the cells of the part; and as the ſerum is ſometimes found to have acquired a viſcid conſiſtence, this circumſtance renders a deep inciſion more neceſſary than it

it otherwiſe would be. In making this inciſion, we have chiefly to avoid what may be properly termed the conſtituent parts of the ſpermatic cord, the ſpermatic artery and vein and vas deferens, and which, in every inſtance, may always with certainty be done.

The contents of the ſwelling being removed, a pledget of ſoft old linen, ſpread with common wax ointment, ſhould be inſerted between the lips of the ſore, which muſt afterwards be treated as a ſimple wound from any other cauſe; by poultices and fomentations, if much pain and a ſcanty ſuppuration take place; and by due attention to dreſſing, ſo as to induce the formation of firm granulations from the bottom.

In ſome inſtances, a cure has been attempted by making deep punctures in different parts of the tumor; but while they do not with ſuch certainty remove the diſeaſe, they are equally painful with an inciſion carried the full length of the tumor.

SEC-

SECTION VI.

Of the Encysted Hydrocele of the Spermatic Cord.

THE surrounding substance of the spermatic cord being entirely cellular, the formation of encysted tumors, we may conclude, ought occasionally to take place here, as well as in other parts of the body; and accordingly we find, in some instances, that water, instead of diffusing itself over the whole spermatic process, is collected in one or more distinct cells or cysts.

This kind of hydrocele being on its first appearance small, gives little or no trouble, and is therefore seldom much noticed, till it has acquired a larger size. In some, it begins in the superior part of the process; but, in general, it is first perceived

ceived towards the lower part of it, a little above the epididymis. By degrees, however, it ſtretches upwards, and, in ſome inſtances, ſo far down as to reach from the abdominal muſcles to the very bottom of the ſcrotum; in which caſe, a perſon who had not formerly ſeen the diſeaſe, might be apt to miſtake it for a hydrocele of the tunica vaginalis. But we have a very certain mark of diſtinction between the two diſeaſes.

In the commencement of this variety of hydrocele, the tumor is always above the teſticle, which is diſtinctly felt below; and in the more advanced ſtages of the diſeaſe, the teſtis is found at the back part of it. Whereas, in the advanced ſtate of a hydrocele of the tunica vaginalis, although ſome degree of hardneſs takes place where the tunica vaginalis adheres to the teſticle, yet when the tumor is large, the teſtis can never be diſtinctly felt. In the encyſted hydrocele of the cord, the figure and ſize of the penis is not commonly ſo much altered, as

as when the water is collected in the tunica vaginalis, in which the penis frequently disappears almost entirely.

In other circumstances, the encysted dropsy of the spermatic cord, is very similar to the hydrocele of the tunica vaginalis testis. A fluctuation of a fluid is sensibly discovered on pressure. The tumor is commonly of a pyramidal form, which is also the case with the other, with its base or largest extremity downward *. And no pressure has any influence in making it disappear, either altogether or in part.

This is the appearance of the tumor when the water is contained in one cyst. When separated into two distinct cells, as sometimes happens, the line of division is

* A hydrocele of the tunica vaginalis testis, is so frequently indeed of a pyramidal form, with its base downwards, that this shape may be considered as one of the characteristic appearances of the disease; every other tumor to which the testis and its coats are liable, being either more round, or of a more irregular shape.

is commonly evident by the tumor being at that part ſomewhat puckered, or diminiſhed in its diameter. A ſimilar appearance alſo takes place, when this variety of hydrocele is combined with a real hydrocele of the tunica vaginalis teſtis, which, in ſome inſtances, happens; and in this caſe, a line of ſeparation may be obſerved, where the upper extremity of the tunica vaginalis terminates.

The means of diſtinction between this ſpecies of hydrocele, and that of the vaginal coat of the teſtis, have already been mentioned. The only other tumors with which it is in danger of being confounded, are, the anaſarcous hydrocele of the ſpermatic cord, and a real hernia, either of the omentum, or of a portion of gut. From the former, however, as alſo from an omental hernia, it may in general be diſtinguiſhed. In neither of theſe, is the fluctuation of a fluid to be perceived, and to the touch they are both ſoft and inelaſtic; whereas, in this variety of hydrocele,

drocele, the tumor has a ſpringy kind of feeling, and a fluctuation is ſenſibly found in it. And in both the others, the ſwelling in ſome degree recedes upon preſſure, which it never does in this variety of encyſted hydrocele.

From a hernia of any portion of gut, it is chiefly diſtinguiſhed by the tumor beginning, not at the ring of the external oblique muſcle, as is the caſe in hernia, but farther down the cord. In the latter, the ſwelling commonly becomes leſs on the patient being placed in a horizontal poſture; and it is always conſiderably affected both by coughing and ſneezing; but no poſture, no preſſure, nor any accidental circumſtance, alters the ſize of this variety of hydrocele. The abſence of the ſymptoms of hernia, too, is here material in the diſtinction. For there is neither pain in the tumor, nor in the abdomen; nor ſickneſs, vomiting, nor any interruption to the paſſage by ſtool, as very commonly happens in hernia.

Although

Although all the ancient writers were ignorant of the anatomy of the parts concerned in this diſeaſe, it is evident they were well aware of its exiſtence. We find it particularly deſcribed by Ægineta, Albucaſis, and afterwards by Fallopius, Wiſeman, and others. Arnaud, in his Treatiſe on Herniæ, alſo takes notice of it, though not with much accuracy; and we find it more lately deſcribed with exactneſs by the late Dr Monro, by Douglas, and by Mr Pott.

This variety of hydrocele, as alſo the anaſarcous ſwelling of the cord, and the œdematous tumor of the ſcrotum, are all frequent in infancy. Theſe tumors, however, in childhood, ſeldom prove permanent. For the moſt part, they readily yield to gentle friction with volatile liniment, or any other ſtimulating or aſtringent application; ſuch as ſpirit of wine, a ſtrong ſolution of alum in water, or of crude ſal ammoniac in vinegar. The late Dr Monro adviſes the application of cloths

warmed

warmed with the fumes of burning benzoin.

Even the hydrocele of the tunica vaginalis ſometimes occurs in early life. I have met with different inſtances of it in children under three years of age; but it is not ſo readily acted upon by the external application of ſtimulants, as the anaſarcous hydrocele.

Whether in children or adults, when this variety of tumor becomes large, we employ either the means for a palliative, or a radical cure, as have been already adviſed in the hydrocele of the tunica vaginalis teſtis.

When it is our intention merely to diſcharge the water by a puncture, it ſhould be done with a trocar, in the ſame manner as was directed in Section III. for a hydrocele of the tunica vaginalis; taking care to introduce the inſtrument at the moſt depending part of the tumor. And again, when we mean to accompliſh a radical cure, the ſame means are to be employed, that have been already advi-

ſed for the radical cure of that variety of the diſeaſe in the tunica vaginalis teſtis. The ſame objections indeed do not here occur to the uſe of the ſeton, as in the hydrocele of the tunica vaginalis, from the preſence of the teſtis. And if we could, in every ſpecies of hydrocele, aſcertain the exact contents of the tumor, the ſeton might, no doubt, be here employed with ſafety and advantage. But, as it is obvious, from what I have already had occaſion to remark, that no certainty of this can at all times be obtained; and, as the hydrocele of a hernial ſac, in which a portion of gut is contained, may be as readily confounded with this as with any other ſpecies of the diſeaſe, I would therefore, even in the hydrocele of the cord, lay this method of cure entirely aſide.

An objection occurs, in this variety of the diſeaſe, to the method of cure by cauſtic, which is not applicable in the hydrocele of the tunica vaginalis teſtis. The ſerum, in ſome inſtances, is collected

ed in two or more cyſts; different caſes of which I have met with; and ſimilar inſtances of it are related by Garengeot, Douglas, and others. Now, in this ſituation, if cauſtic ſhould be applied in the method recommended by Mr Elſe, upon a ſmall ſpot only, all the water would not be diſcharged; and, in order to obtain a complete removal of the diſeaſe, it would be neceſſary to repeat the application of the cauſtic to every cyſt in which ſerum might be collected.

This, I think, is an additional reaſon for our giving a general preference to the method of cure by inciſion; which, by laying the tumor open from one end to the other, divides at once all the different cyſts of which it may be compoſed, and ſaves the patient from that diſtreſs and diſappointment which muſt always be experienced, on a complete cure not being obtained, when good reaſons had been previouſly given for expecting it. I would therefore adviſe the treatment by inciſion to be preferred in this ſpecies of hydro-

cele, as I have done already in the hydrocele of the tunica vaginalis; and the mode of performing the operation, and the after-treatment of the patient, are nearly the ſame in each.

I have thus enumerated every hydrocele that can be properly conſidered as forming a diſtinct variety of the diſeaſe. In doing ſo, as I have deſcribed no tumor but ſuch as every practitioner of experience muſt have met with, and of which the ſymptoms are clearly and diſtinctly marked, ſo it will not, I hope, be conſidered as an unneceſſary degree of minuteneſs, that I have particularly taken notice of them all.

I can by no means agree with ſome authors, particularly with Mr Sharpe * and Mr Elſe, who think that it might be better to confine the deſcription of hydrocele to two varieties. We need not indeed wonder at Mr Sharpe ſpeaking in this manner; for, even at the late period in

* Treatiſe on the Operations of Surgery.

in which he wrote, although the existence of all the varieties of the disease that I have mentioned had been described by different authors, yet they were not understood with much accuracy; and it is evident from Mr Sharpe's writings on the subject, that his ideas of them were in many respects more confused than might have been expected in one of his usual accuracy and penetration. But, whatever was the case with Mr Sharpe, it is truly surprising, that those who are unquestionably well informed in every circumstance relating to this disease, and who must be convinced, from frequent dissections, of the existence of all the varieties that I have been mentioning, should object to their being retained. Where no evident or marked distinction occurs between one tumor and another, an attempt to establish a difference would be useless, and therefore improper; but where appearances point out an obvious variety, it would surely be considered as much want

of accuracy in an author to omit the detail of them.

In the defcription that I have given of the five different fpecies of hydrocele, to wit, the anafarcous fwelling of the fcrotum, the hydrocele of the tunica vaginalis teftis, the hydrocele of the hernial fac, the anafarcous and the encyfted hydrocele of the fpermatic cord, it was neceffary to enumerate the fymptoms of each, as they occur feparately and uncombined. It fometimes happens, however, that one, two, or more of the different varieties occur at the fame time in the fame patient. I have met with inftances of three, and not unfrequently with two varieties in the fame perfon. The late Dr Monro mentions an inftance of four fpecies of hydrocele being all combined in one cafe *.

In fuch cafes, fome difficulty and confufion is, no doubt, to be expected; but practitioners, in forming a judgment of their nature, muft be entirely directed by due

* Vide Monro's Works, 4to, p. 576.

due attention to the various ſymptoms which take place in each variety of the diſeaſe, when met with ſeparately, and unconnected with others.

We now proceed to the conſideration of the other varieties of falſe hernia; and firſt of the hæmatocele.

CHAPTER XXV.

On the Hæmatocele.

THE hæmatocele is a tumor in the ſcrotum or ſpermatic cord, produced by extravaſated blood.

The uſual ſeat of this diſeaſe is in the tunica vaginalis of the teſtis; but, in ſome inſtances, it is ſeated in the ſpermatic proceſs, and occaſionally it is met with with in the dartos.

The hæmatocele always ariſes from the rupture or diviſion of one or more blood-veſſels, and it is moſt frequently the effect of external violence. Blows upon the ſcrotum, and bruiſes received in riding, ſometimes

ſometimes burſt the veins, not only in the cellular ſubſtance of the ſcrotum, but in the vaginal coat of the teſticle. Accidents of a ſimilar nature have produced ſimilar affections in the courſe of the ſpermatic cord; and, as the parts in this ſituation are ſoft and cellular, the rupture either of an artery, or a vein of any conſiderable ſize, is, for the moſt part, attended with a plentiful extravaſation of their contents.

In the tunica vaginalis teſtis, a hæmatocele is ſometimes induced by the point of a trocar, or of a lancet, in tapping for a hydrocele, wounding ſome of the bloodveſſels of the ſac, which, in ſuch caſes, are commonly enlarged.

We become certain of what has happened, by the ſerum, as it runs off, being ſuddenly tinged with blood; but, in ſome inſtances, this does not appear till the collection is all diſcharged, when the firſt intimation we receive of it is by the ſudden appearance of a tumor in the ſite of the hydrocele. I have now met with various

inſtances of this, in all of which the tumor produced by the extravaſated blood arrived at a very conſiderable height in the courſe of a few hours.

In ſome, the diſeaſe is produced in a different manner. Where the quantity of ſerum has been large, the ſudden diſcharge of it, by taking away the ſupport which the veſſels have been accuſtomed to receive from it, is not unfrequently the cauſe of the rupture of ſome of them; and, from repeated obſervation, I think it may be conſidered as certain, that whenever a large tumor is produced ſuddenly, that is, in the courſe of an hour or two, either in the ſcrotum, or ſpermatic cord, after the contents of a hydrocele have been diſcharged by tapping, that it ariſes entirely from extravaſated blood; for collections of water are never known ſo quickly to become large.

In the ſpermatic proceſs, injuries of the ſame kind will be attended with a ſimilar effect upon the ſmall veins of the ſac containing the water; and more conſiderable violence

violence has, in ſome inſtances, produced a rupture of the ſpermatic artery and vein.

But, in whatever way the tumor has been produced, the appearances are nearly ſimilar to thoſe of watery collections in the ſame parts; ſo that it is not neceſſary to repeat them here; only it may be remarked, that, when blood is extravaſated in the cellular ſubſtance of the ſcrotum, it is eaſily diſtinguiſhed from a collection of water by the colour, as it aſſumes all the uſual appearances of an echymoſis. When the collection is ſeated in the tunica vaginalis, the means of diſtinction are not ſo obvious; but I may remark, that a tumor produced by blood is heavier than one of the ſame ſize produced by water; and practitioners, much accuſtomed to handle theſe ſwellings, can in ſome inſtances judge of their contents from their conſiſtence, by the difference which this gives to manual examination.

The

The treatment of this kind of tumor is nearly the ſame with that which I have adviſed in Sect. IV. Chap. XXIV. In the commencement of the anaſarcous or diffuſed hæmatocele, when produced by external violence, whether in the ſcrotum or ſpermatic proceſs, the application of ardent ſpirits, a ſolution of alum, volatile liniment, or a ſtrong ſolution of ſal ammoniac in vinegar, will, in ſome inſtances, remove it. But, when this does not ſucceed, and eſpecially if the tumor acquires a greater bulk, it muſt, in that caſe, be laid open, and, in every reſpect, treated in the ſame manner as has been already directed for the hydrocele; only I may remark, that, if a ruptured bloodveſſel is diſcovered, the only effectual means of preventing a return of the tumor, is to ſecure it with a ligature.

In like manner, all collections of blood, whether in the vaginal coat of the teſtis, or in the cyſt of a former hydrocele of the ſpermatic cord, are to be laid open by an inciſion, extending the whole length of

of the tumor, and, in other reſpects, treated exactly as I have adviſed in the fourth ſection of the preceding chapter, for a hydrocele. And I need ſcarcely obſerve, that, if any ruptured veſſel comes in view in the courſe of the operation, it ought to be immediately ſecured with a ligature: otherwiſe a conſtant diſcharge of blood may be looked for during the cure; the patient will be thereby much incommoded and weakened, and the cure unneceſſarily protracted.

It ſometimes happens, however, whether the diſeaſe is ſeated in the ſpermatic proceſs, or tunica vaginalis teſtis, that the veſſels from whence the blood is diſcharged cannot be diſcovered; a very conſiderable oozing, continuing from day to day, notwithſtanding the uſe of bark, vitriolic acid, and every other means that are commonly employed. As patients in this ſituation ſoon become weak and emaciated, one great object of the practitioner is to ſupport them with nouriſhing food. A moderate allowance of animal food proves

proves always useful; nor is it found that a liberal use of wine does harm. In some instances, I have even thought that it tended to lessen the discharge.

I have uniformly, however, found, that local remedies prove chiefly useful, particularly the application of ardent spirits, ether, or tincture of myrrh, to the surface of the sore: pledgets of soft lint, soaked in one or other of these, and renewed from time to time, not only serve to check the discharge of blood, but tend, for the most part, to promote the formation of good matter.

In some instances, however, all our endeavours fail, and the patient continuing to lose ground daily, we are warranted in advising any measure that may probably tend to save him. In such circumstances, the extirpation of the testicle has been advised. At one time, I was induced to think favourably of this measure; but further experience has not shown, that much dependence is to be placed on it. At least, in two cases, in which it was

was put in practice, no advantage was derived from it; while, in both, it was the cause of much additional distress. I do not, therefore mean ever to advise it again.

Another variety of tumor produced by blood is mentioned by Mr Pott, in which the blood is contained within the tunica albuginea of the testis. It proceeds, he thinks, from a relaxation or dissolution of part of the vascular structure of the testicle; and, when the quantity of blood collected is considerable, it produces, Mr Pott remarks, a fluctuation somewhat like to that of a hydrocele of the tunica vaginalis.

When this is mistaken for a hydrocele, as it has sometimes been, and an opening with a trocar is made in it, a discharge is produced, of a dark dusky coloured blood, nearly of the consistence of thin chocolate; but the diminution of the tumor, by this evacuation, is seldom considerable.

The

The perforation, therefore, made in it with the trocar does no good; and as the teſticle is commonly ſo far ſpoiled by the diſeaſe as to be rendered entirely uſeleſs, caſtration is adviſed as the beſt remedy *.

I have different times met with a diſeaſe very ſimilar to this deſcribed by Mr Pott: but as the blood in ſuch inſtances did not appear to be extravaſated, but to be ſtill contained in the veſſels of the teſtis, in an enlarged varicoſe ſtate, I am not inclined, therefore, to refer this kind of tumor to any ſpecies of hæmatocele, but rather to conſider it as a variety of varix. I have even ſeen this variety of tumor miſtaken for a hydrocele, and treated as ſuch, by a trocar being plunged into it, when the effects were exactly what are deſcribed by Mr Pott. But, if the blood had been extravaſated, a more copious diſcharge would have taken place from the perforation, than was obtained by it in any of the caſes to which I allude. Even where the tumor has

* Mr Pott's Treatiſe on the Hydrocele.

has been of a conſiderable ſize, I never found it poſſible to evacuate in this manner more than a ſpoonful or two of blood, and although, in ſuch caſes, the blood appears evidently more viſcid than in a ſtate of health, this is not in ſuch a degree as ought to prevent it from being freely diſcharged by the canula of a trocar, were it lodged in a ſtate of extravaſation.

In all the caſes that I have ſeen of this tumor, when it was not opened, but merely ſupported by a ſuſpenſory bag, it has remained indolent and ſtationary for many years. But whenever it has been touched with an inſtrument in order to diſcharge its contents, it has from that moment gone wrong. The patient who had ſuffered little previous pain, ſoon became greatly diſtreſſed; the ſwelling then began to increaſe; ſeparate encyſted collections formed in it; theſe at laſt burſt and left an ugly ſore of an unequal ſurface, and a putreſcent bloody diſcharge, on which no application had any effect; ſo that caſtration at laſt became neceſſary.

Even this does not always afford relief; for, in some instances, such a spongy relaxed state of the vessels takes place along the whole course of the cord, that, though they are secured with ligatures to-day, blood bursts out at different parts to-morrow. Of this I was once concerned in a very distressful instance. After the usual operation of castration, fresh hæmorrhagies occurred at every dressing; the vessels were at different times secured with ligatures, but to no purpose; the blood burst out again and again; and the patient, after suffering much distress from this cause alone, at last died.

The chief differences which, before laying the parts open, can be observed between this variety of tumor and a hydrocele of the tunica vaginalis, is, that in this, the fluctuation is never so evident as in the other; the tumor is heavy in proportion to its size; the form not so pyramidal as that of a hydrocele; and if properly supported with a bandage, it does not receive any additional increase.

Whenever

Whenever theſe circumſtances, therefore, occur in the ſame caſe, they give much reaſon to ſuſpect, that the diſeaſe is of this kind; and therefore, that no operation ſhould be adviſed. The patient ſhould be deſired to truſt entirely to a well-adapted ſuſpenſory bag; to avoid ſevere fatigue; and to prevent a coſtive ſtate of the bowels, which in all diſeaſes of theſe parts, very conſtantly does harm.

END OF VOLUME FIFTH.

EXPLANATION

OF THE

PLATES.

Plate XLI.

Fig. 1. A Speculum oris, which I proposed a considerable time ago, and which in different cases has been used with advantage. By occupying less space in the mouth than the instruments in common use, it may be employed where they are inadmissible. *B*, A handle of timber, through which the screw

A C is paſſed, by which the plate of iron *D* may be more or leſs ſeparated from the fixed plate *E*, by turning the nut *A*. The plates *D E* ſhould be ſufficiently firm for reſiſting the preſſure of the jaws, and covered with leather or cloth to prevent the teeth from being injured.

Fig. 2. Another form of a ſpeculum for the mouth. *G H*, Two firm iron plates, which being inſerted betweeen the teeth of the upper and under jaws, may be ſeparated to any neceſſary degree by turning the handle *F*. The farther extremity of the plate *G* is intended to compreſs the tongue, an addition which may be eaſily made to fig. 1.

Fig. 3. The inſtrument in common uſe as a ſpeculum oris; but it is ſo defective that it can ſeldom be uſed with advantage.

Plate XLII.

Fig. 1. A kind of cutting forceps, the invention of the late Dr John Aitken: They

They may be employed either in the hare-lip, or for the removal of cancer of the lip: One blade of the forceps is a plane ſmooth ſurface, while the other is furniſhed with a ſharp-cutting edge. In uſing this inſtrument the two blades muſt be preſſed againſt each other with one hand, with a force ſufficient to divide the parts that are meant to be cut; while the other hand is employed in ſecuring the handles.

Figs. 2. and 3. Forceps, for laying hold of the lip in performing the operation for the hare-lip, or in removing cancers of the lip, by which the parts are more ſecurely fixed, and may be more neatly cut than when held with the fingers only.

In fig. 2. the blades are both lined with timber, and the blade *A A* being conſiderably broader than the other, the lip may be divided by cutting directly down upon it, and carrying the ſcalpel in cloſe contact with the ſide of the oppoſite blade.

Plate XLIII.

Fig. 2. Sciſſars of a ſufficient ſize and ſtrength for dividing the parts in the operation for the hare-lip.

Fig. 2. Cutting pliers for the purpoſe of removing ſmall ſplinters of bone where-ever they are met with, particularly in the amputation of limbs.

Plate XLIV.

As the cure of the hare-lip is a point of much importance, I have judged it proper to delineate the appearance of the diſeaſe, together with that of the parts in which it is ſeated during the different ſtages of the operation and cure.

Fig. 1. A hare-lip, in its moſt common form. *A*, One of the inciſores appearing in the centre of the opening, which ought to be removed before the operation, as a tooth in this ſituation is very apt to interrupt the cure. *B B*, The unequal edges

edges of the fiſſure with which hare-lip is very commonly attended.

Fig. 2. The appearance of the parts after the edges of the fiſſure have been removed and the pins introduced. *C C*, The edges of the cut, which ought to be ſmooth, equal, and exactly of the ſame length on each ſide, ſo that when drawn together no inequality may take place. The firſt pin ſhould be inſerted near to the under part of the lip, and the upper pin near to the ſuperior point of the fiſſure. The pins repreſented in this figure are furniſhed with moveable ſteel points, ſo that the points may be taken away on the ligatures being applied, as is done in fig. 3. which exhibits the appearance of a hare-lip immediately after the operation.

Fig. 4. A lip after the cure is finiſhed. *D*, Repreſents the appearance of the cicatrix, which in general ſhould be nearly a ſtraight line.

Fig. 5. A flat pin for the operation of the hare-lip. The pin itſelf, fig. 6. ſhould

ſhould be of gold, and the point, fig. 7. of ſteel.

Plate XLV.

Figs. 1, 2, 3, 4, and 5. Different forms of ſcaling inſtruments for removing tartar and other extraneous matter from the teeth.

Figs. 6. and 7. Inſtruments that may be employed either for burning the nerve of a tooth, or for ſtuffing a hollow tooth with gold or lead. Fig. 8. may likewiſe be employed for the ſame purpoſe, but it is more frequently uſed for ſearching behind and between the teeth, when there is any ſuſpicion of a latent caries that is not readily diſcovered.

Fig. 9. Another inſtrument for ſtuffing carious teeth. And,

Fig. 10. A handle to which all theſe inſtruments may be fitted.

Plate XLVI.

Fig. 1. The inſtrument commonly termed a key for extracting teeth. After many alterations being made in it, the one here delineated is the beſt I have ever uſed.

In fig. 2. the inſtrument in common uſe, the claw is fixed, and can only be moved by taking out the ſcrew by which it is connected with the inſtrument; but in fig. 1. the claw can be moved from one ſide to another, merely by preſſing upon the nut *A*, by which the ſpring *B* is raiſed out of a niche in a wheel which is thus rendered moveable, and in which the claw is fixed. *C*, The heel of the inſtrument which is here repreſented not only of a greater depth, but conſiderably longer than uſual: Of this length it is applied to a conſiderable extent of gums, by which the jaw is not ſo apt to be injured as when the heel is much ſhorter; and of this depth it acts with more power

power than when of the uſual form. This part of the inſtrument ſhould not only be well poliſhed, but thickly covered with ſeveral plies of ſoft old linen in order to render the preſſure produced by it upon the gums as eaſy as poſſible. The handle *D* is ſometimes made of iron; but it anſwers better either of ivory or timber.

Fig. 3. A claw bent in ſuch a manner, that when the heel of the inſtrument *C* is placed upon any part of the gums, the ſecond or third tooth farther in the mouth, may be pulled with it. This proves ſometimes uſeful, where the gums oppoſite to the affected tooth are particularly tender; and it ſhould always be employed when it is meant to pull either of the two fartheſt molares of the lower jaw outwards; for in uſing the common inſtrument for theſe teeth, the gums that cover the projecting part of the coronoid proceſs of the jaw are always much lacerated.

Figs. 4. and 5. Two claws of different ſizes of the ordinary form.

PLATE

Plate XLVII.

Figs. 1. and 3. Two inſtruments much employed in different parts of Europe for extracting teeth. They do not, however, poſſeſs any advantage over the key-inſtrument; and they are liable to this objection, that they cannot be uſed where a tooth muſt be turned towards the inſide of the mouth.

Fig. 1. *A*, The fulcrum, which ought to be well covered with ſoft old linen or cotton: *B*, The claw fixed to the handle *E*, by a ſmall hole in the end of it, which receives a knob of a correſponding ſize, at *C*, and is retained in its ſituation by a moveable plate of poliſhed iron *D*. The handle ſhould be wood, and all the reſt of the inſtrument iron or ſteel. Fig. 2. A claw with a conſiderable degree of curvature, for extracting teeth at a greater depth in the mouth than the fulcrum can be placed at.

Fig.

Fig. 3. *F*, The fulcrum. *E*, A ſtraight claw fixed to the inſtrument by a ſcrew at *H*. *I*, The handle, which ſhould be of wood.

Plate XLVIII.

Figs. 1. 3. and 4. Different forms of forceps for extracting teeth. Fig. 3. is the moſt uſeful of any that I have ſeen.

Fig. 2. Small diſſecting forceps employed in different operations in the mouth, as well as in other parts.

Plate XLIX.

Fig. 1. Teeth forceps with moveable claws, *A*. And,

Fig. 2. A fulcrum to be uſed along with the forceps, fig. 1., both deſcribed in Vol. V. p. 53.

Fig. 3. An inſtrument for dividing the frænum linguæ.

Plate L.

Figs. 1, 2, and 3. Different forms of a punch or lever for extracting ſtumps of teeth. Figs. 1. and 3. are the beſt. They conſiſt of two parallel plates of poliſhed iron, which may be ſeparated more or leſs by preſſing the moveable ſliders *AB* higher or lower.

Fig. 4, 5, 6, and 7. Different forms of files for removing inequalities upon teeth. Some of theſe ſhould have one ſide entirely ſmooth, ſo that in acting upon a diſeaſed tooth, the contiguous ſound tooth may not be injured.

Plate LI.

Fig. 1. A very ingenious improvement of the key-inſtrument by Mr Robert Clarke, ſurgeon in Sunderland. The points in which this inſtrument chiefly differs from the key in common uſe, are the

the manner in which it is connected with the handle *A B*, the form of the claw *C*, and of the fulcrum or rest *F*, and the bend in the shank at *D E*, by which in drawing teeth inwards, the foreteeth are more certainly avoided than can be done with the common instrument.

This instrument is also so contrived that the claw can be quickly changed or turned to an opposite direction, by means of a sliding bolt passing through the claw, instead of a screw: but for a more particular account of it, see Medical Facts and Observations, London. Vol. VI. Art. VIII. by which Mr Clarke seems to have made some alterations in the form of the instrument; the one that he there describes being somewhat different from that which the cutlers here have made of it.

Fig. 2. Is an instrument, from which, in particular circumstances of incontinence of urine, much advantage may be derived. It was worn by a Dutchman who presented himself at this place three winters ago, with a singular and curious conformation of

of part of the organs of urine and generation, of which an account has already been publiſhed.

A B C. The body of the inſtrument ſo conſtructed as to be exactly adapted to the parts on which it is applied: This, as well as all the reſt of the machine, ſhould be made of ſilver, with the edges properly ſtuffed with leather, flannel, or cotton, for protecting the ſkin on which it reſts, and which is eaſily done by means of a number of ſmall holes round the whole of it at *C.* It is fixed to a circular belt round the loins by two pieces of tape, one at the opening *A*, and another on the oppoſite ſide of the inſtrument, which in this view of it cannot be ſeen, and at *E* there is another piece of tape which goes between the legs, and fixes it to the circular belt behind.

This inſtrument proves particularly uſeful to all who are diſtreſſed with incontinence of urine, accompanied with fiſtulous openings in the ſcrotum or contiguous parts that communicate with the urethra,

 and

and it is even eaſily adapted to theſe parts, ſo as to cover entirely the ſcrotum and penis, by which it may be employed with advantage in every variety of the diſeaſe.

When urine paſſes either from the penis, or from fiſtulous openings that communicate directly with the bladder, it runs down to *D*, the entrance into the receptacle *E F*, which contains ſeveral ounces, and from whence the urine cannot again return, but paſſes out at the outlet *G*, as often as the patient finds it convenient to remove a well-adapted cork with which the opening *G* ſhould be furniſhed.

Plate LII.

Figs. 1, 2, and 3. Different forms of inſtruments employed for concentrating ſound in caſes of deafneſs.

Fig. 4. A ſyringe of a proper ſize for waſhing the meatus auditorius.

Figs.

Figs. 5. and 6. Inſtruments for perforating the lobes of the ear.

Plate LIII.

All the figures in this plate repreſent glaſſes for drawing milk from the breaſts of women. With figs. 1. and 3. the breaſt may either be ſucked by the perſon herſelf, or by an aſſiſtant; and fig. 2. is a glaſs cup, mounted with a bag of elaſtic gum. *A*, The glaſs cup joined to the bag *C* by the intervention of a braſs tube *B*.

Plate LIV.

Fig. 1. An inſtrument for ſupporting the head after the operation for the wry neck. *A B C*, A curved plate of iron, covered with ſoft leather and properly ſtuffed, fitted to the ſhoulder, and ſupporting another plate,

to the top of which is connected the plate *D E F*, upon which the head is meant to reſt, and which ſhould alſo be covered with ſoft leather or cotton. *G H I*, A buckle and ſtrap for fixing the inſtrument round the neck.

Figs. 2, 3, and 4. Different kinds of cups, which may be either of ivory, lead or ſilver, for covering and protecting the nipples, when they are either chopped or otherwiſe diſeaſed. The holes in their brims are for receiving pieces of ſmall tape for fixing them round the body.

Fig. 5. A broad flat needle, of a lancet-form for introducing cords or ſetons in different parts of the body.

Plate LV.

Fig. 1. This figure is the invention of Mr Chabet of Paris, and is taken from the Second Volume of Memoirs of the Royal Academy of Surgery: It is the beſt inſtrument

inſtrument that has yet been publiſhed for compreſſing the jugular vein.

Fig. 2. A curved grooved director, for introducing a ſeton or cord along the courſe of an abſceſs.

PLATE LVI.

Fig 1. An inſtrument for fixing the canula after the operation of bronchotomy. *A*, A plate of thin-poliſhed ſteel, with a curvature correſponding to the anterior part of the neck. *B B*, The extremities of the plate *A*, with which the ſtraps *C C* are connected, for the purpoſe of fixing the inſtrument by means of a buckle on the back-part of the neck. *E*, A moveable frame, which ſhould be made to paſs eaſily up and down on the two perpendicular branches of poliſhed ſteel *D D*, fixed to the inſide of the plate *A*. In this frame there is an opening a little above *E*, for receiving the double canula repreſented by the inferior letter *F*. The letter *F* oppoſite to *E*, re-

 preſents

presents a small screw, which passes through the under-part of the frame; and by pressing upon the under-part of the canula, it thus serves to fix it exactly where it is placed after the operation.

As the frame is made to slide easily upon the two branches *D D*, and as the double canula *F* can be inserted to any depth in the trachea, and can be fixed by the screw passing through the under-part of the frame, this instrument is accordingly found to answer every purpose expected from it. It is the invention of Dr Monro, and it has in different cases been employed with advantage.

Fig. 2. An instrument for perforating the trachea in the operation of bronchotomy. *G*, The point of the perforator passing through the double canula *H*.

Fig. 3. A representation of the double canula unconnected with the perforator.

PLATE

PLATE LVII.

Figs. 1. and 2. Two inſtruments termed Probangs, for the purpoſe of puſhing ſuch ſubſtances into the ſtomach as are fixed in the œſophagus. It conſiſts of a piece of ſoft ſponge, firmly tied to a piece of flexible whalebone, fifteen or ſixteen inches in length. The whalebone ſhould be well poliſhed; and in order to render the introduction of it as eaſy as poſſible, it ſhould be dipped in fine oil.

Fig. 3. A ſcarificator, for the purpoſe of opening abſceſſes in the fauces, or for ſcarifying the amygdalæ when inflamed.

Fig. 4. The ſcarificator covered with a ſilver canula. *A*, The handle of the ſcarificator; *B*, a ſcrew-nail fitted to the hole in the ſcarificator; by which the length of the point to be left uncovered at the extremity of the canula *C* may be exactly regulated.

Plate LVIII.

Fig. 1. A flat trocar.

Fig. 2. Another form of flat trocar, a very neat invention of Mr Wallace, a surgeon of eminence in Glasgow. This instrument consists of a stilette or perforator, fig. 4. exactly adapted to the silver canula, fig. 3. The canula is open on one side, which admits of the perforator being broader than itself, as is represented in fig. 2. By this means an opening is made by the perforator, which allows the canula to pass with ease, and as the sides of the canula do not fall together on the perforator being withdrawn, this instrument is not liable to an objection that occurs against the trocar of Mr André, represented in Plate LIX. fig. 2. with which there is some risk of the steel plates doing harm to the contents of the abdomen on these plates falling together, which they do with some force on the canula being withdrawn.

Fig.

Fig. 5. A trocar of a common triangular form, for the purpoſe of puncturing the bladder: The round or triangular form of this inſtrument makes it more proper for this operation than trocars with a lancet point, which are not ſo well adapted for the different ſteps of the operation; and the groove in the ſtilette or perforator, by commencing at the point, and being continued through the whole length of it, ſerves to mark with much certainty its entrance into the bladder, for the urine flows along the groove immediately on the point of it having entered the bladder.

Fig. 6. A flat ſilver canula, with a ſmall curvature for leaving in the opening after the operation for the empyema.

Plate LIX.

Fig. 2. A trocar, the invention of Mr André. Fig. 3. The canula of this inſtrument

ment is formed of two hollow plates of elaſtic ſteel, firmly united together at their larger extremities by two ſcrew-nails. The tube formed by theſe two hollow plates is of ſuch a ſize as to allow the perforator, fig. 1. to be puſhed into it with very little force; and the elaſticity of the plates, which admits of their yielding to this paſſage of the perforator, enables them to return inſtantly to form the ſame ſize of tube, as ſoon as the large extremity of the inſtrument *A* has fairly paſſed the extremity of the plates.

The point of the perforator with a ſmall portion of the extremity of the tube being puſhed into the vaginal coat, the perforator is to be then withdrawn, which, when the inſtrument is properly made, may be done without much force.

The chief advantage of this inſtrument is, that the point of the perforator making a larger opening than the canula, the latter thereby enters with much eaſe.

But although this invention of Mr André's

dré's is neat and ingenious, it does not appear to be very neceſſary; for, when the flat trocar, fig. 4. of the ſame plate is well finiſhed, and the ſilver at the extremity of the canula is thin and properly fitted to the perforator, it enters with ſufficient eaſe, as alſo happens with the trocar of Mr Wallace, deſcribed in fig. 2. Plate LVIII., while neither of theſe inſtruments is liable to the important objection that occurs to that of Mr André, noticed in the explanation of that plate. The canula of Mr André's inſtrument has alſo this diſadvantage, that being made of poliſhed ſteel, it is almoſt impoſſible to make it ſo dry after being uſed, as to prevent it from ſuffering with ruſt, where the two plates are fixed together by ſcrew-nails.

Fig. 5. A ſyringe for throwing liquids into the tunica vaginalis teſtis in the cure of hydrocele by injections, for which purpoſe it requires to be exactly fitted to the tube fig. 2. Plate LXVI.

Plate LX.

In this plate is reprefented what I confider as an important improvement on the apparatus for perforating the bladder above the pubes, an operation of much moment, in fo far as it is never performed but in cafes of great danger, and although eafily done, is apt to induce fuch a number of diftrefsful confequences, as nothing but a continued courfe of attention, combined with much experience, and many opportunities of performing the operation, can tend to obviate.

By experience I have found, that the common trocar does not anfwer fo well for this operation, as one of a larger diameter, and one of a round form anfwers better than a flat one, for a large round one does not fo readily injure the bladder.

Fig. 1. A trocar of a proper fize, both in length and diameter. *A A*, a moveable cape

cape or ſhield, fixed on the canula *B* by means of a ſcrew, and from which it can at any time be eaſily removed. The ſlits and holes in the cape, as may be more particularly ſeen in the front view of it, fig. 5. ſerve to attach pieces of ſmall tape, for the purpoſe of fixing the canula to a circular belt previouſly fixed round the loins: As it is a point of much importance in this operation, to have the canula kept ſteadily in its place, I have ſometimes done it by fixing adheſive plaſters to the cape of the canula, and applying the plaſters firmly upon the contiguous parts: With ſome, this has anſwered better than bandages, but others have preferred the tapes attached to a circular belt. In one caſe, where it anſwered remarkably well, the cape of the canula was ſewed to the circular band, by paſſing the threads through the few ſmall round holes, and the canula, as well as the belt, was prevented from moving either upwards or downwards, by two double pieces of tape, attached

attached to the canula at the long ſlits, two paſſing over the ſhoulders were carried backwards and fixed to the circular band behind, while the other two being carried downwards, one on each ſide of the ſcrotum was alſo fixed to it behind. In this manner, after various methods had been tried in vain, the canula was eaſily kept in its ſituation.

The next object of importance, is to prevent the back-part of the bladder from being hurt by the friction of the canula: This we endeavour to do by uſing a trocar that will not probably reach ſo far; but even with this in view, the ſharp edges of the canula are apt to hurt the bladder. It is however effectually prevented by the addition of fig. 3., a firm ſilver wire with a round button or ſtopper of ſilver *E*, which removes the ſharp edges of the canula, as is ſeen at *C*, fig. 2. If *E* is exactly adapted to the canula, no urine gets into it, by which no calculous incruſtation forms in it, as is apt to happen

pen where this precaution is omitted. *D* being a plug of common cork, the ſtopper is thereby prevented from falling out.

The patient ſhould be warned to remove the ſtopper frequently, and to empty the bladder; for where this is neglected, the urine neceſſarily eſcapes between the bladder and canula.

It is ſcarcely neceſſary to remark, that the canula muſt in every inſtance be worn till the urine flows freely off by the urethra. In a great proportion of caſes this happens in the courſe of a ſhort time, but in ſome not till many months have elapſed. During the inflammatory ſtate of the diſeaſe, the bladder commonly forms ſuch adheſions to the contiguous parts, that after the canula has remained long inſerted, we might, in various inſtances, withdraw it for the purpoſe of clearing away any incruſtations that form in it, as in a great proportion of caſes, it could be eaſily inſerted again: But as theſe adheſions do not always happen, and as much danger

danger would occur from our not being able to replace the canula, it ought never to be withdrawn till another canula is inserted, which is eaſily done, in the following manner:

Let a canula be provided, ſomewhat more than double the length of the other, and of a ſize that admits of its paſſing eaſily through it: This canula muſt conſiſt of two pieces ſcrewed together, as is repreſented at F. fig. 4. The ſhorteſt piece being exactly the length of the canula of the trocar, being all paſſed into it, the canula of the trocar is then to be withdrawn, by pulling it along the whole length of the tube: After clearing the canula of the trocar, an attempt may be immediately made to replace it, by puſhing it along the tube into the bladder; and in ſuch attempts we commonly ſucceed: But we derive a very important advantage from having the long tube previouſly inſerted, as the patient remains in ſecurity in the event of our not being able

to

to paſs the other again into the bladder, as in ſome inſtances has been the caſe: In this caſe, a cape or ſhield, with an opening fitted to the diameter of the ſmall tube, muſt be fixed upon it at the ſcrew *H*, when by undoing the connection of the two parts of the tube at the ſcrew *F*, a canula is left exactly of the ſame length with that of the trocar, to be fixed in the ſame manner, and fitted with a correſponding plug or ſtopper, ſimilar to fig. 3.

Plate LXI.

The figures in this plate repreſent a ſet of inſtruments for the ſame purpoſe as thoſe in the preceding plate, a very neat and elegant invention by Dr Monro, and the following explanation of them is in the Doctor's own words:

Fig. 1. A trocar of an ordinary ſhape, and of a proper ſize.

Fig. 2. A ſteel canula with a handle: The canula is open on one ſide, and thin at its point, that it may paſs eaſily with the trocar into the bladder.

Fig. 4. Gives a ſide view of a blunt ſilver canula, which, after the trocar is withdrawn, is to be introduced through the ſteel canula, which has a broad ſhield with holes in it for fixing it by ligatures in its place: Two views are given of the canula; the oblique view of it ſhews the direction that it ſhould have in paſſing into the bladder, which ſhould be downwards and backwards, that it may be in leſs danger of injuring the back-part of the bladder. *A*, a plate to be held between the finger and thumb, while the ſteel canula is withdrawing. *B*, the end of the ſilver canula, to be paſſed through a hole in a piece of waxed or oiled ſilk, and then tied to it: This piece of waxed ſilk ſaves the ſkin from being excoriated, and ſerves, beſides, to direct, occaſionally, the urine into a baſon.

Fig.

Fig. 5. A ſmall ſilver plug to be put into the end of the ſilver canula, in order to prevent the conſtant eſcape of urine: This is to be taken out from time to time, and the urine received into a baſon.

Fig. 6. A perpendicular view of the ſhield. *A*, The top of the canula. *B*, a plate of metal which ſerves as a handle, and likewiſe to connect the canula to the ſhield. *C*, a large opening through which the handle *A* of the ſteel tube, fig. 3. may paſs, and as the oppoſite ſide of the ſteel tube has a ſlit in it, the ſteel tube can be withdrawn after the ſilver canula has been paſſed through it into the bladder.

D D D D, Holes in the ſhield, by means of which, a circular ſtrap put round the body, may be readily connected with it for ſupporting it exactly in its proper place.

Plate LXII.

Fig. 1. A biſtoury with a probe of flexible ſilver joined to it, for the operation of the fiſtula in ano, which in various inſtances I have uſed. It will be readily underſtood, that this inſtrument will not anſwer where the ſinus does not communicate with the gut.

Fig. 2. A bandage for the paracenteſis of the abdomen, originally invented by the late Dr Monro. This bandage ſhould be made of ſoft leather, lined with flannel. *A*, the body of the bandage, which ſhould be of ſuch a length as to paſs from one os ilium, acroſs the abdomen, to the other, to be there fixed by the ſtraps *BBBB* to the buckles *CCCC*. The ſtraps *DD*, by paſſing over the ſhoulders, ſerve to fix the buckles *EE*, which paſs through between

between the thighs; by which almoſt every part of the abdomen may be ſufficiently compreſſed. When the operation of tapping is to be performed, the bandage ſhould be fixed in this manner, care being taken to leave the hole *F* open, exactly oppoſite to the ſpot in which the perforation is to be made, which for this purpoſe ſhould be previouſly marked with ink. On the water being all drawn off, and a pledget applied upon the wound, the opening *F* muſt be ſhut by the ſtrap *G*, and the buckle *H*, as repreſented by the letter *I*.

In this manner, any neceſſary preſſure may be applied, which, after this operation, is of much importance, and ought not to be omitted.

Plate LXIII.

Fig. 1, 2, and 3. repreſent different parts of a machine for injecting tobacco-ſmoke into the rectum.

Fig. 1. A braſs box for containing the burning tobacco. The mark *A* is a bottom or diviſion in the inſide of the box, perforated with ſmall holes to admit the paſſage of the ſmoke to the extremity of the box *B*; which, by a male ſcrew, is adapted to a braſs tube, fig. 3. at *C*, which is again fitted to an elaſtic leather-pipe *D*, terminated by a common glyſter-pipe *E*. The pipe *D* is made of waxed leather, protected by braſs wire rolled ſpirally round it from one end to the other.

Fig. 2. repreſents the covering of the box, fig. 1. to which it muſt be exactly fitted. *F*, a diviſion of thin braſs, perforated with a number of ſmall holes for admitting the paſſage of the air from a pair of bellows fitted to the opening *G*.

Fig. 4. The inſtrument completely fitted on a ſmall ſcale. *H*, a pair of double bellows, whoſe tube *I* is fitted by a ſcrew to an opening in the cover of the box *K*, which again is terminated by the braſs tube *L*, the leather-pipe *M*, and the ordinary glyſter-pipe *N*.

The

The box *K* being filled with burning tobacco, and the glyſter-pipe *N* being inſerted into the anus, by working the bellows *H*, any neceſſary quantity of ſmoke may be very quickly thrown up.

It is ſcarcely neceſſary to obſerve, that all the parts of this machine ought to be exactly fitted to each other, with a view to prevent the eſcape of ſmoke at any of the joints.

Bellows of the ordinary ſize anſwer the purpoſe; and are preferable to thoſe that are ſmaller, as being better calculated for injecting the ſmoke quickly. The braſs-box for the tobacco ſhould be about an inch and half in diameter, by three inches in length from the brim to the bottom; the braſs tube connected with the box ſhould be ſix inches in length, by a quarter of an inch in diameter. The leather-pipe ought to be of nearly the ſame diameter with the tube, and about two feet and a half in length. When of this length, it is eaſier managed than when ſhorter; and

it ſerves more effectually to cool the ſmoke before it reaches the bowels.

The glyſter-pipe, at the end of the leather-pipe, ought to be ſomewhat larger and wider than thoſe in ordinary uſe.

Plate LXIV.

Fig. 1. Another inſtrument for injecting tobacco-ſmoke, originally invented by the celebrated Profeſſor Gaubius. The principal difference between this and the inſtrument repreſented in Plate LXIII. is, that in this the tobacco-box *A*, is fitted to the air-hole of the bellows; ſo that in working the bellows, the air with which they are ſupplied entering at the openings *B*, the ſmoke of the burning tobacco muſt accordingly paſs through them; and from the bellows it is thrown into the other parts of the inſtrument, and in that manner tranſmitted to the inteſtines.

The

The inſtrument repreſented in Plate LXIII. is wrought with more eaſe than the one here delineated.

Fig. 2. A crooked biſtoury, with a blunt or probe point. The curve here repreſented is much leſs than is uſually given to this inſtrument, and the blade is alſo much narrower: It ought, indeed, to be altogether ſtraight, excepting a very ſlight curvature towards its point.

This biſtoury is well calculated for dividing the ſtricture in caſes of hernia; for opening ſinuſes in every ſituation; and particularly for dividing the rectum in the operation of the fiſtula in ano.

Fig. 3. A biſtoury with a greater curvature than the other, which in ſinuſes of particular directions ſometimes proves uſeful.

Plate LXV.

Fig. 2. A ſpring truſs for an inguinal or femoral hernia of the right-ſide. *A*, the

the bolſter or pad for preſſing upon the opening at which the parts protrude. *B*, a ſtrap with holes in it for fixing upon the knobs on the back-part of the pad. *C*, a ſtrap hanging down from the back-part of the bandage, to be paſſed between the legs of the patient; and to be alſo fixed upon the knobs of the pad by the holes in its extremity.

This ſtrap is intended to fix the bandage firmly in this ſituation; but if the bandage is properly made, and the ſteel-ſpring of which it is compoſed is ſufficiently elaſtic, there is no neceſſity for this ſtrap, which always frets and galls the parts upon which it is made to paſs.

Fig. 1. Repreſents a bandage alſo for the right ſide, but with no back-ſtrap, and by means of a retch the pad can be made to compreſs the parts more or leſs even after the belt is fixed.

Fig. 5. A double bandage for a hernia on each ſide, with two back-ſtraps connected with it.

The

The ſteel of which theſe bandages are made ſhould be covered with thin ſoft leather, properly ſtuffed with wool or flannel. The pads ſhould be broader than they are uſually made, with a prominence or ſlight elevation in the middle, and their ſides perfectly flat.

Fig. 3. Repreſents a bandage for umbilical ruptures. *A*, a ſteel ſpring to be applied upon the umbilicus after the hernia has been reduced, and to be retained in its ſituation by the bandage *B*; which, by means of the ſtraps *C C C* and the buckles *D D D*, may be kept at any degree of tightneſs. *E E*, two ſtraps for paſſing over the ſhoulders; and *F*, a ſtrap for paſſing between the legs, the whole to be fixed upon knobs on the back-part of the bandage oppoſite to the ſpring *A*. By means of theſe buckles and ſtraps, the bandage may be preſerved very firmly in its ſituation.

The belt *B* ſhould be five or ſix inches broad, and the ſteel ſpring *A* ſhould be of

a

a ſize proportioned to the opening it is intended to preſs upon. All the parts of the bandage ſhould be of ſoft leather, lined with flannel or cotton *.

Fig. 4. A ſilver canula for paſſing into the urethra after amputating the penis: The threads attached to it are meant to fix it to a ſmall circular roller round the penis.

Fig. 6. A ſmall director, open at the point or extremity, a very uſeful inſtrument in the operation for the reduction of ſtrangulated hernia.

Plate LXVI.

The figures of this plate repreſent an apparatus for the cure of hydrocele with injections: The method of uſing it is deſcribed

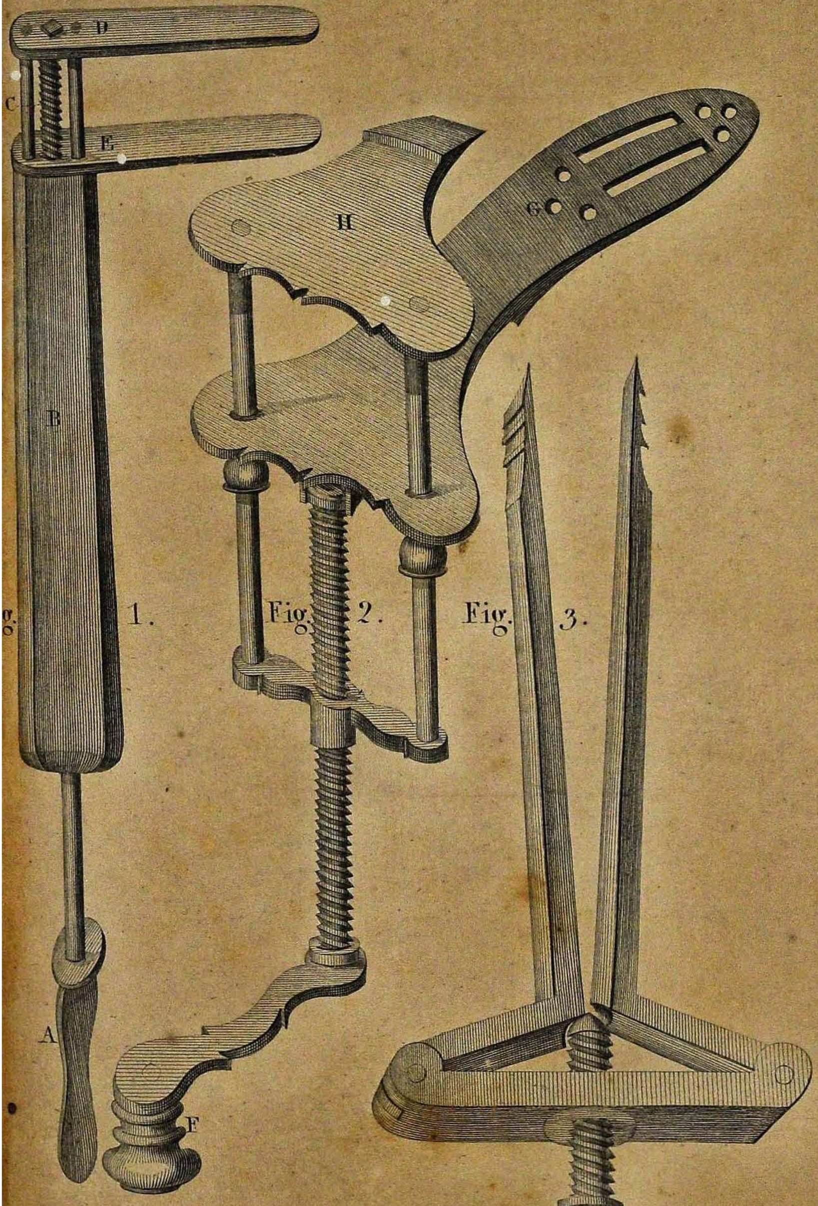
* The ſpring here repreſented is taken from a figure repreſented by the late Dr Monro in his treatiſe on that ſubject. See his works in 4to.

ſcribed in Chap. XXIV. Volume V. page 482. The ſyringe, Plate LIX. fig. 5. may alſo be adapted to fig. 2. of this plate, and uſed inſtead of the bag of reſina elaſtica, fig. 1.

Plate LXVII.

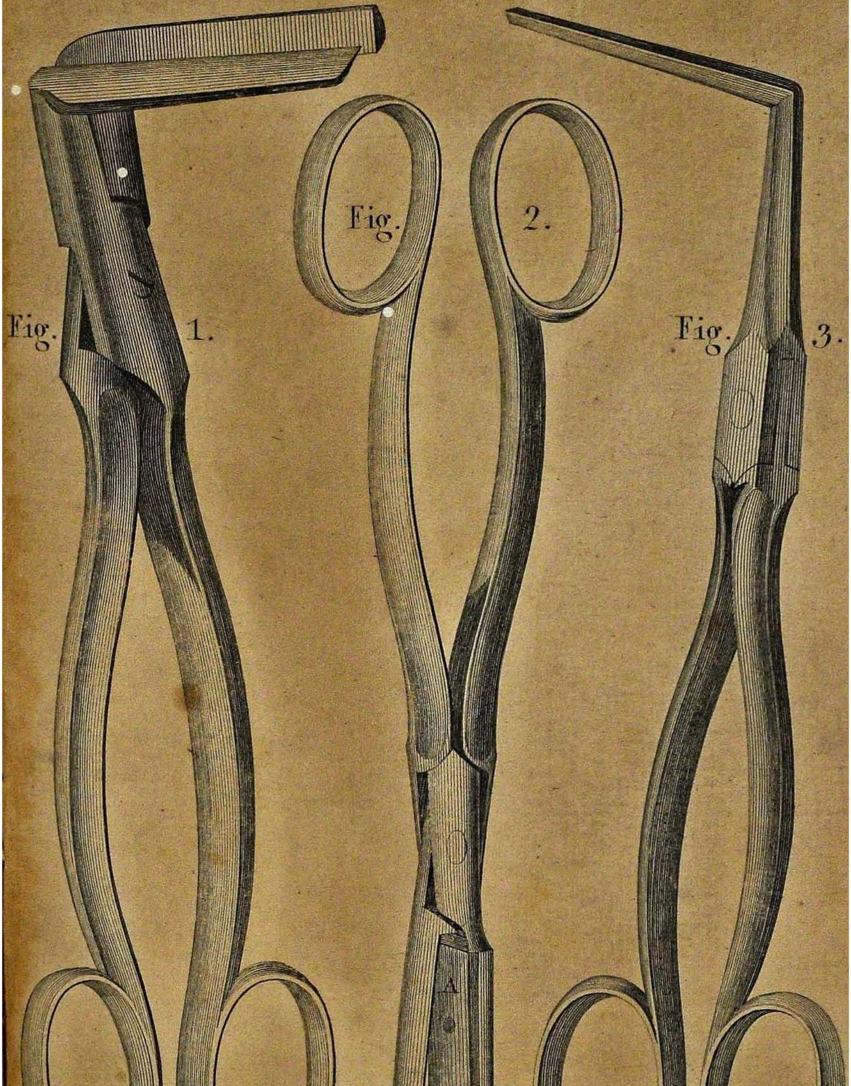
The figures of this plate repreſent a ſet of inſtruments for the cure of hydrocele with a ſeton deſcribed in Chap. XXIV. Volume V. pages 436, 437.

PLATE XLI.



D.Lizars Sculp

PLATE XLII.



D Lizars Sculp

PLATE XLIII.

Fig. 1.

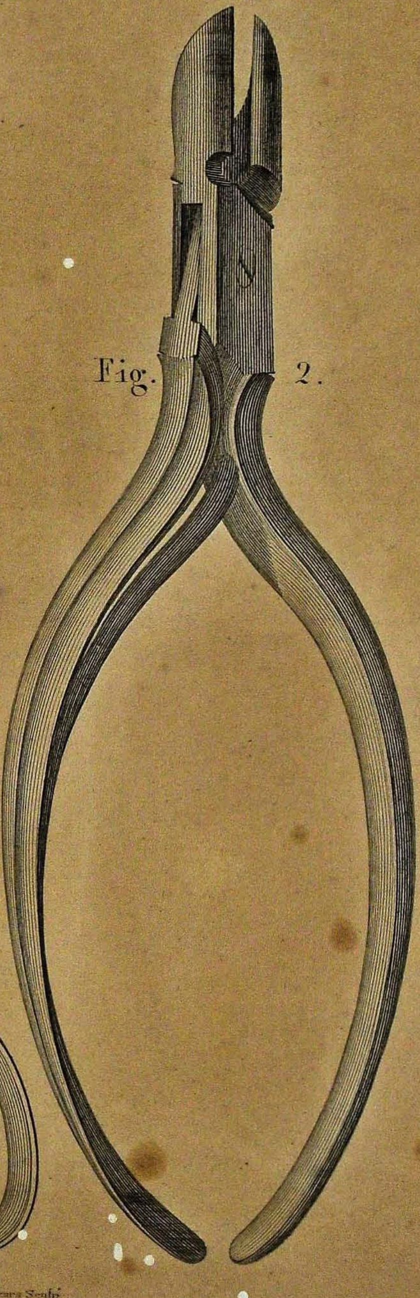


Fig. 2.

B. Lazaro Sculp

PLATE XLIV.

Fig. 1.

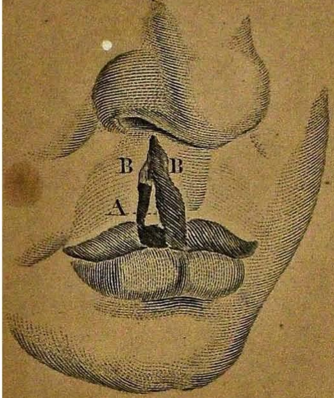


Fig. 2.

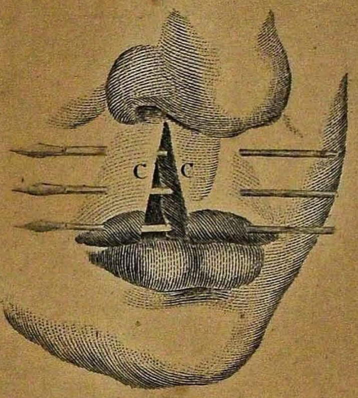


Fig. 3.

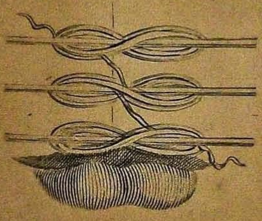


Fig. 4.

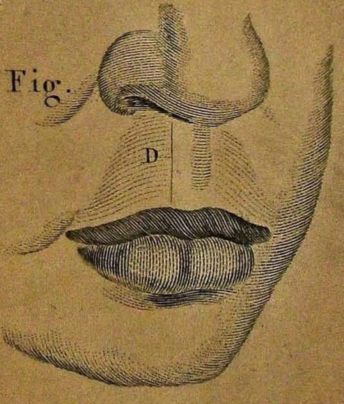


Fig. 5.

Fig. 6.

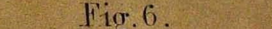


Fig. 7.

PLATE XLV.

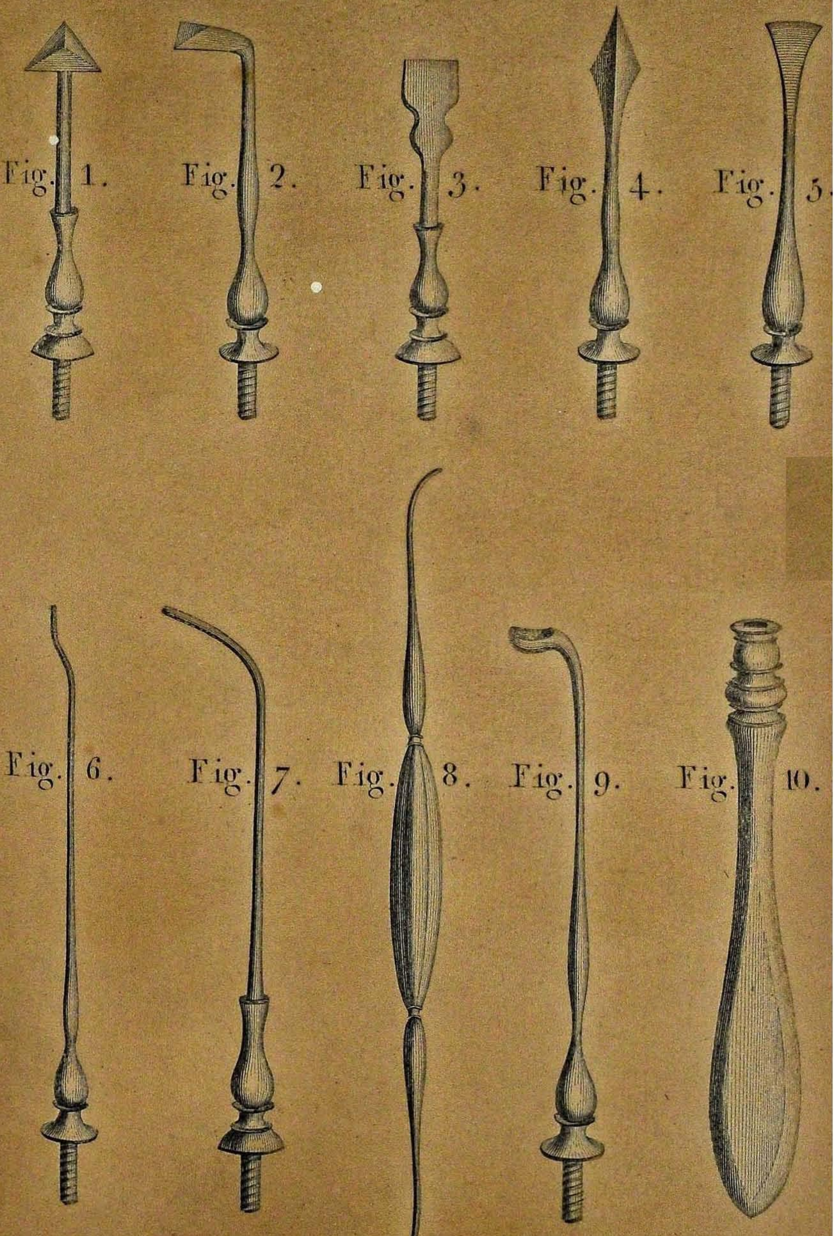
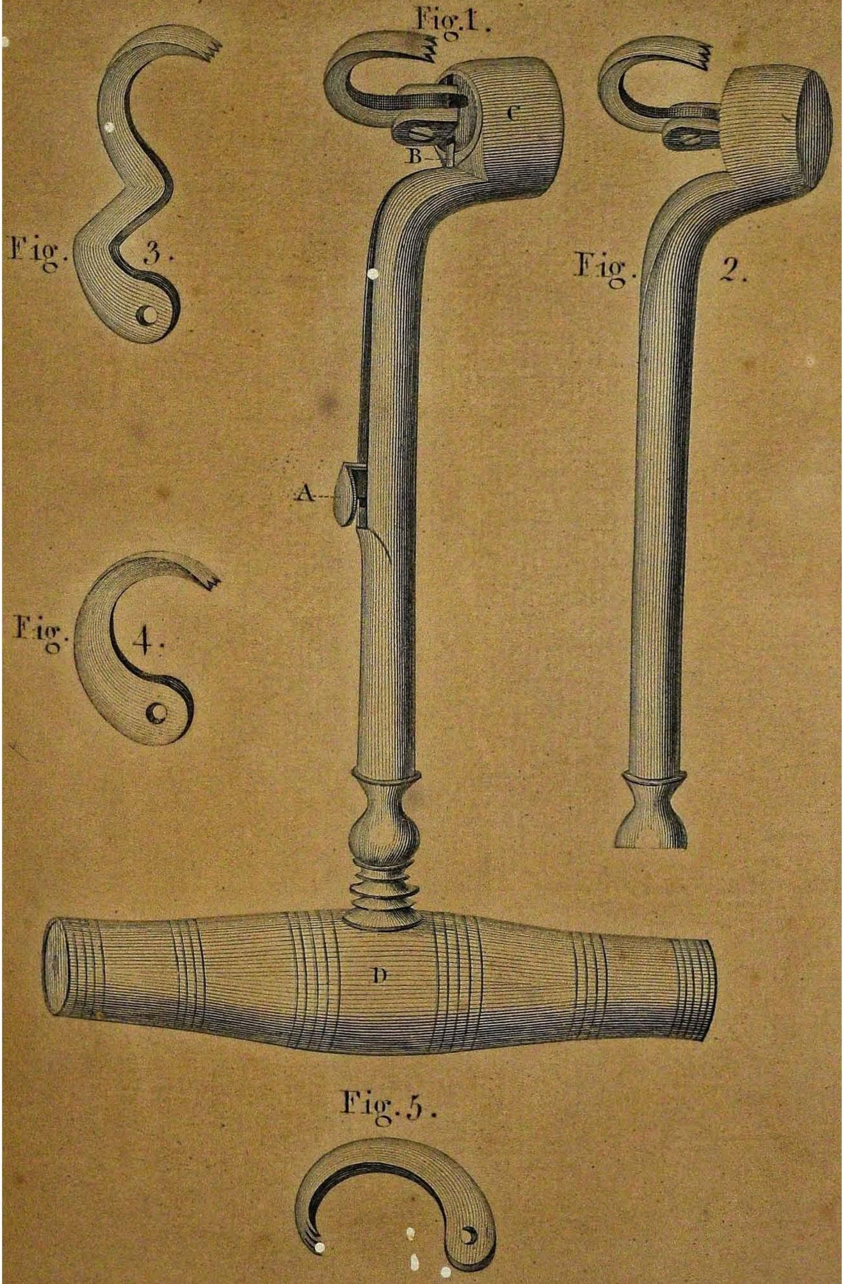
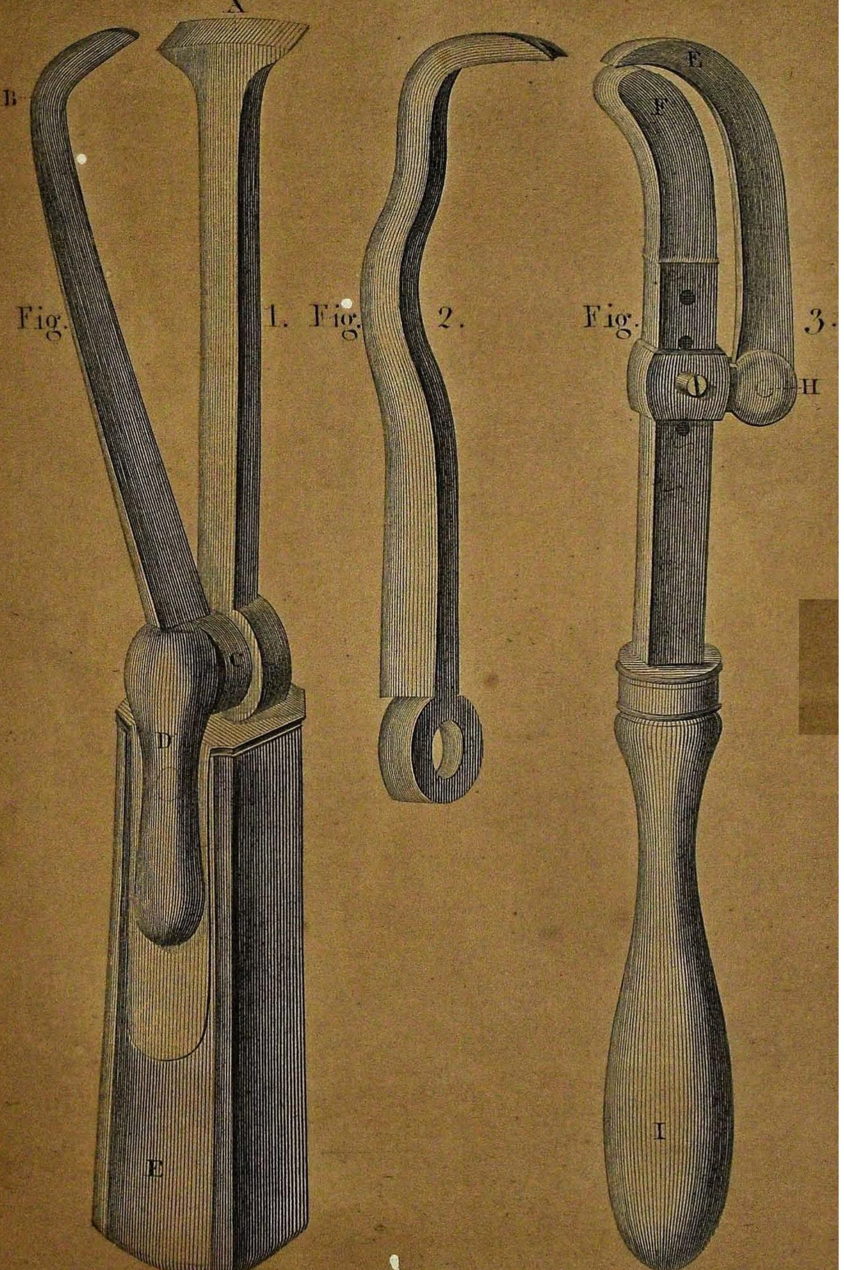


PLATE XLVI.



D. Lizars Sculp

PLATE XLVII.



D.Lizars Sculp

PLATE XLVIII.

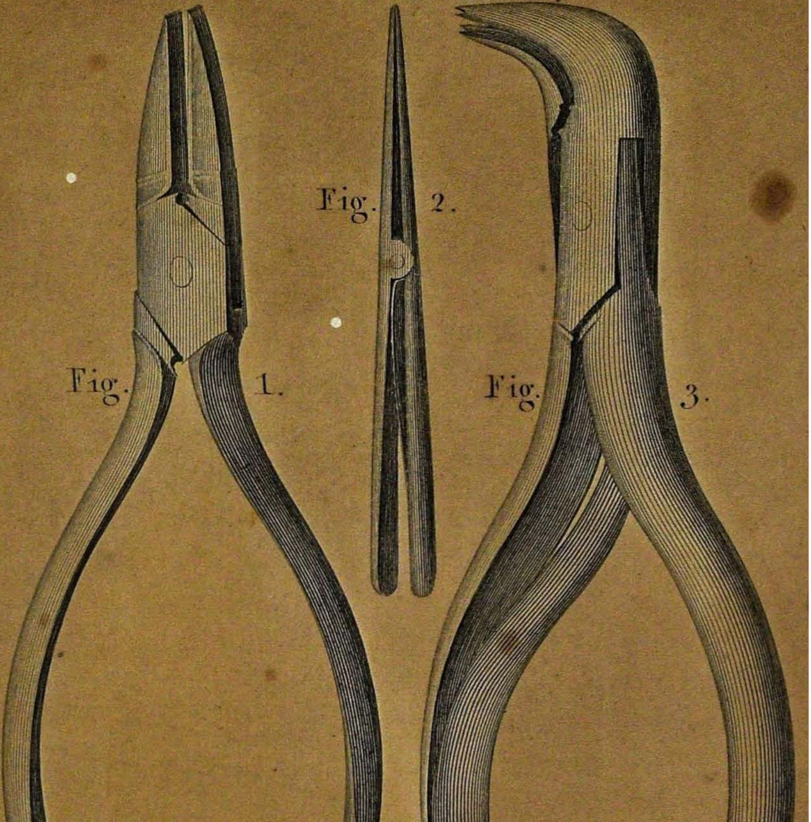


PLATE XLIX.

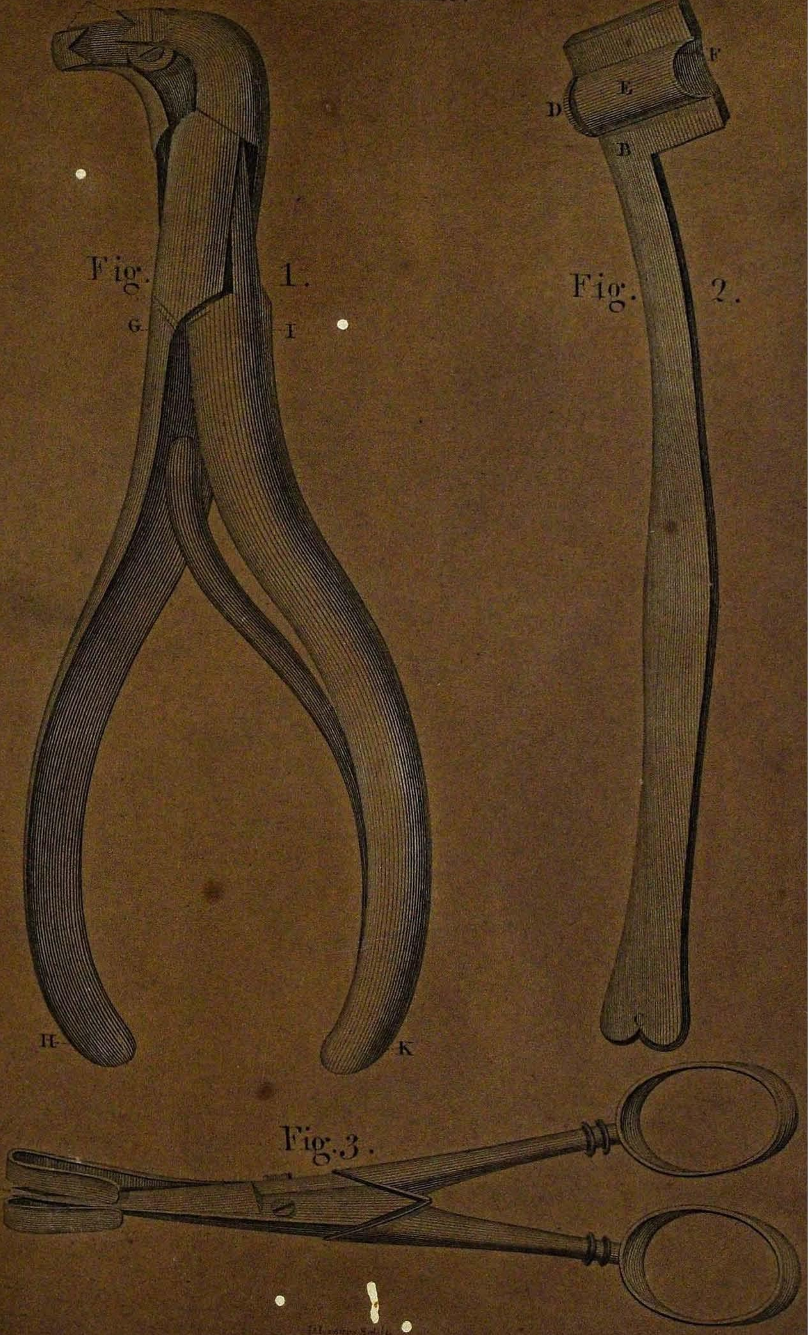


PLATE I.

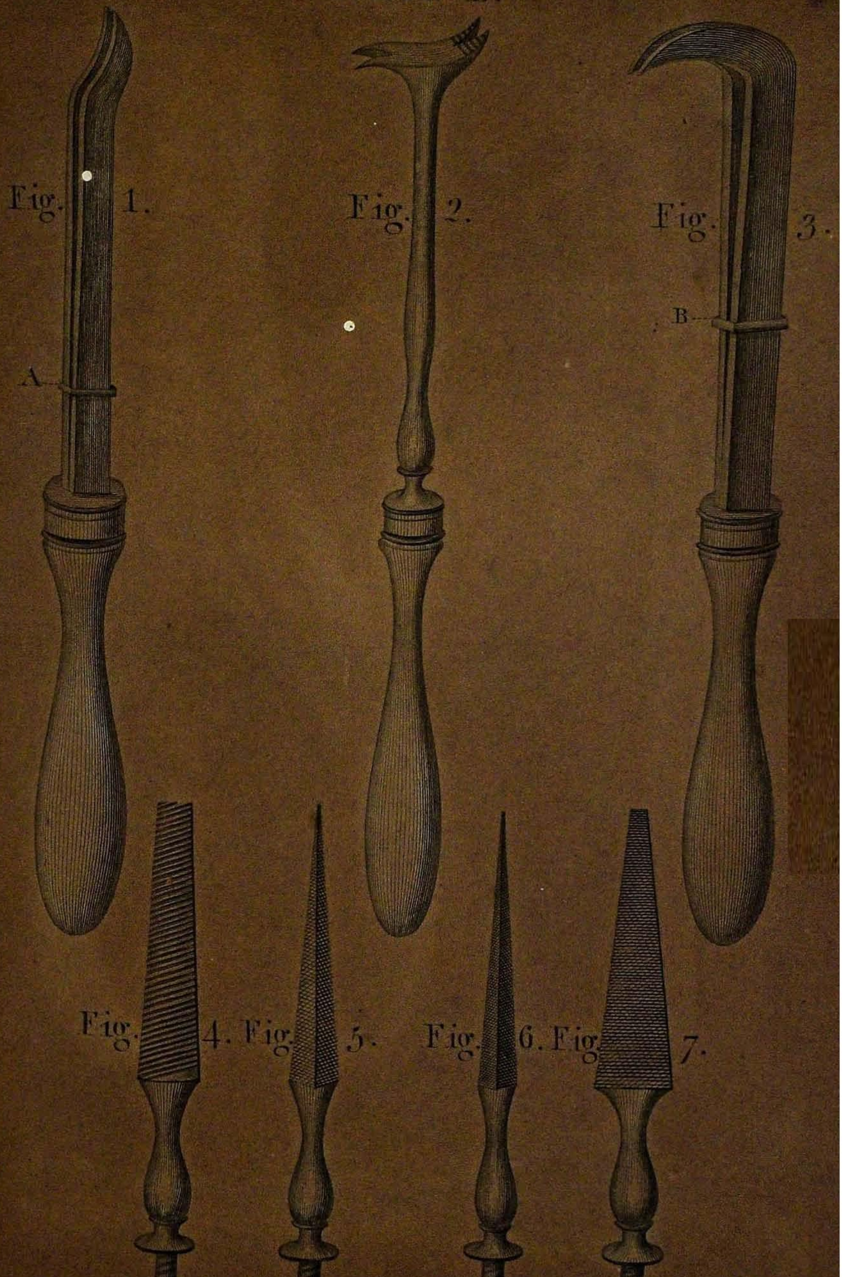


PLATE LI.

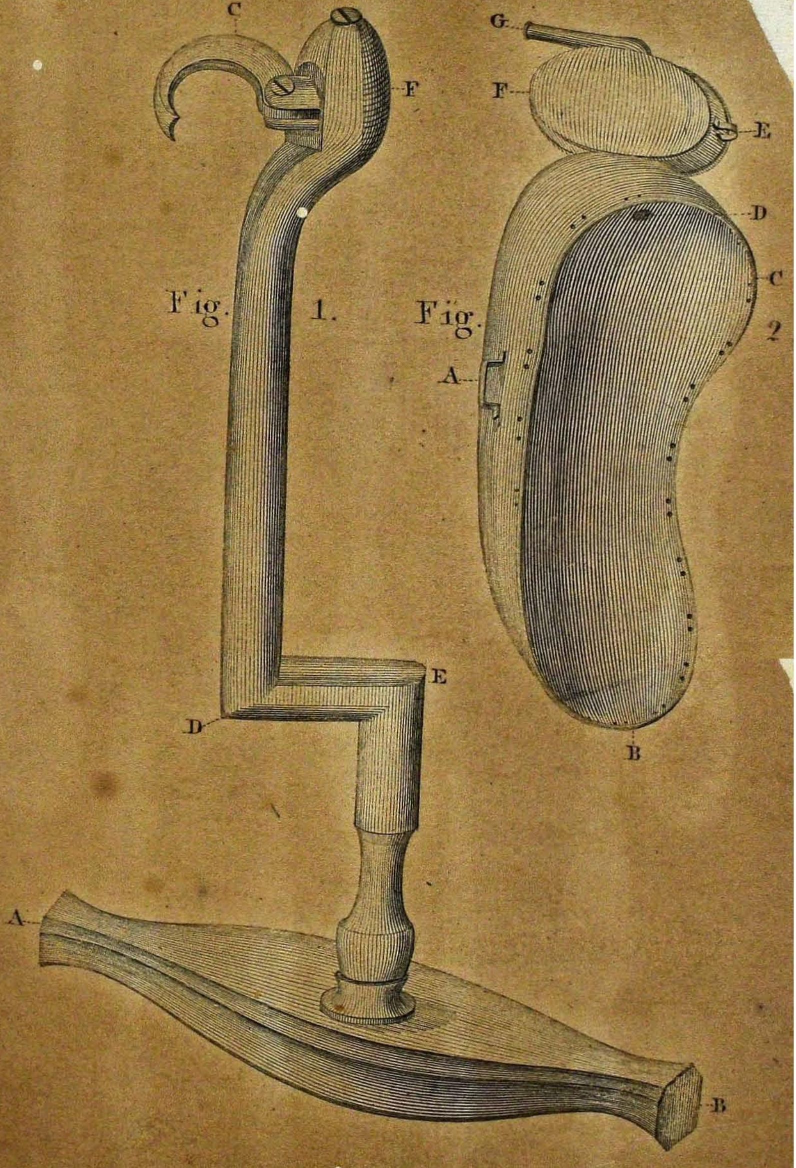


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PLATE LII.

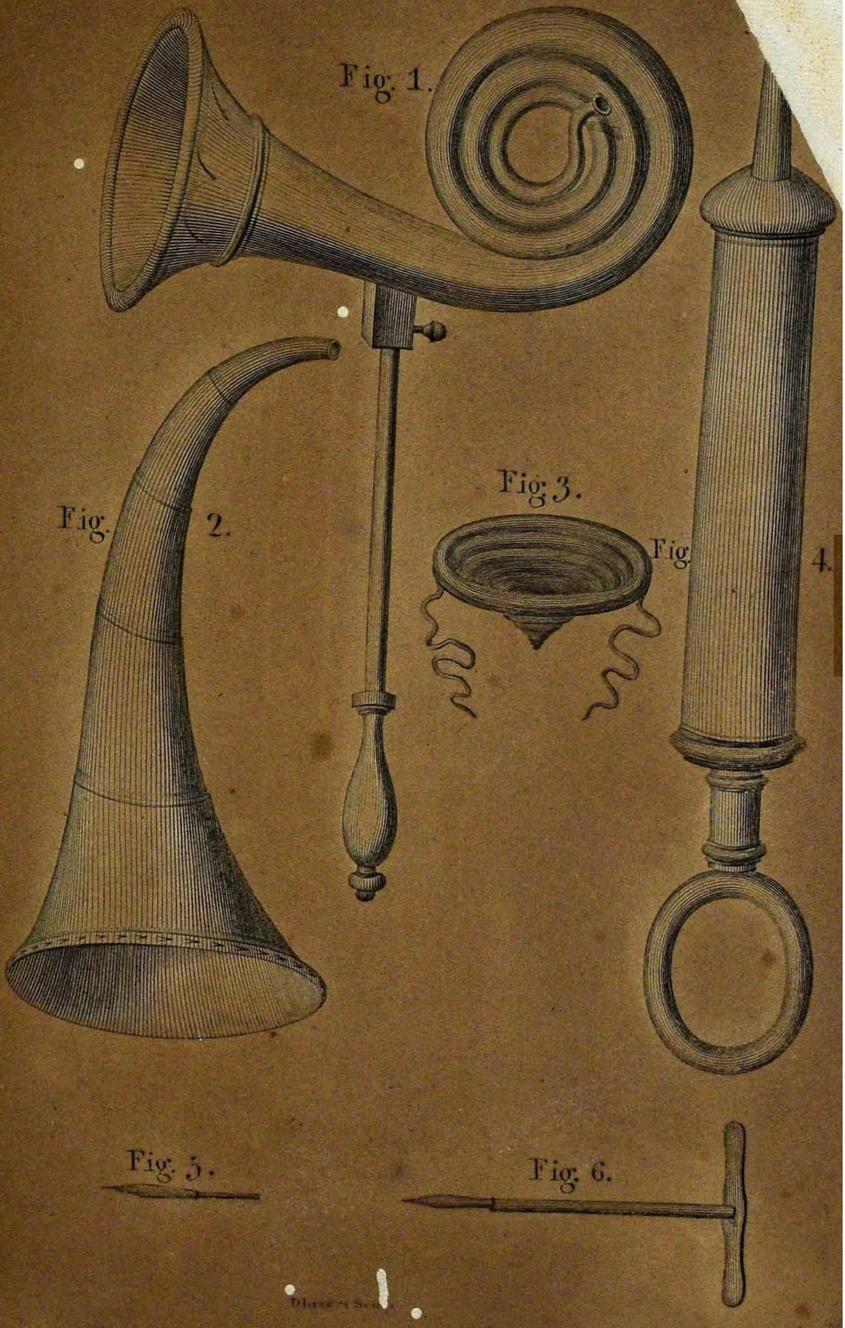


PLATE LIII.

Fig. 1.

Fig 2.

Fig. 3.

PLATE LIV.

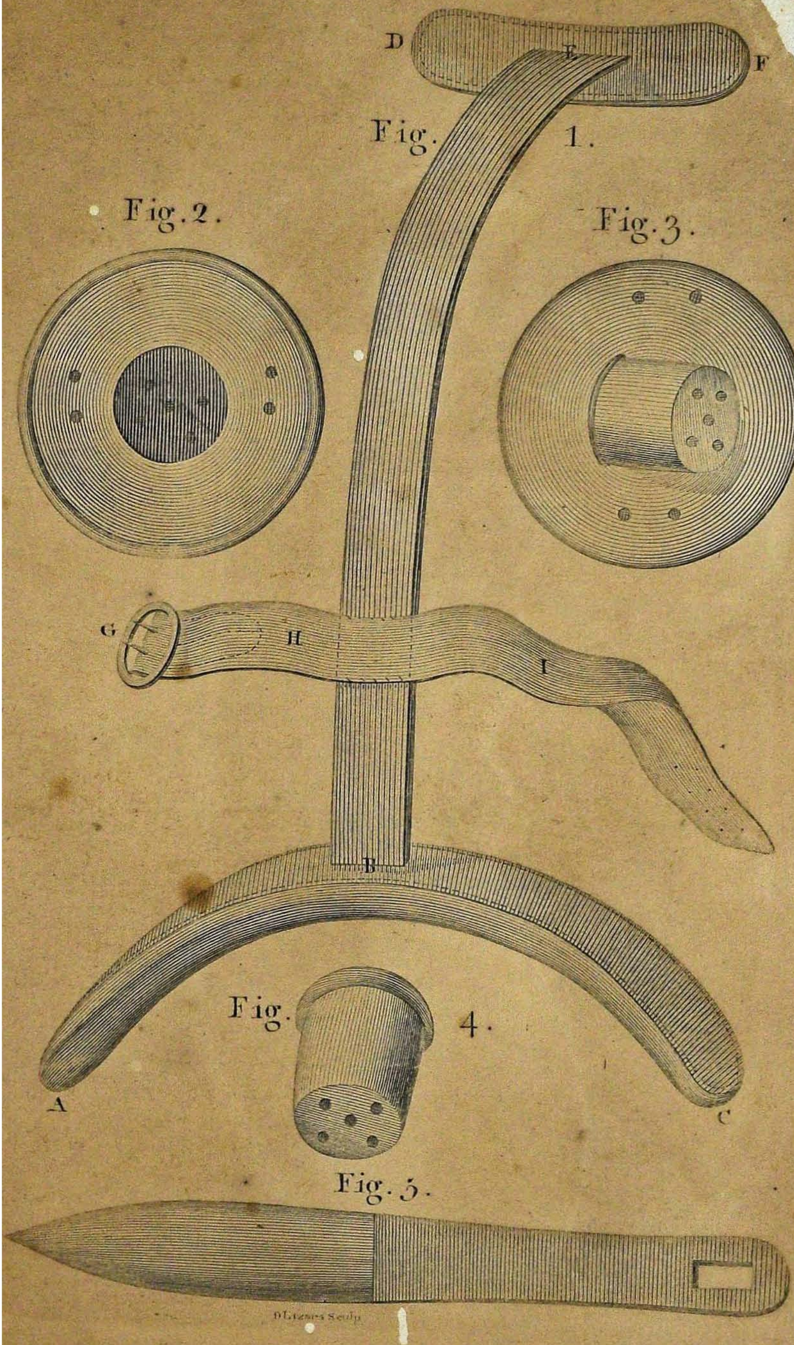
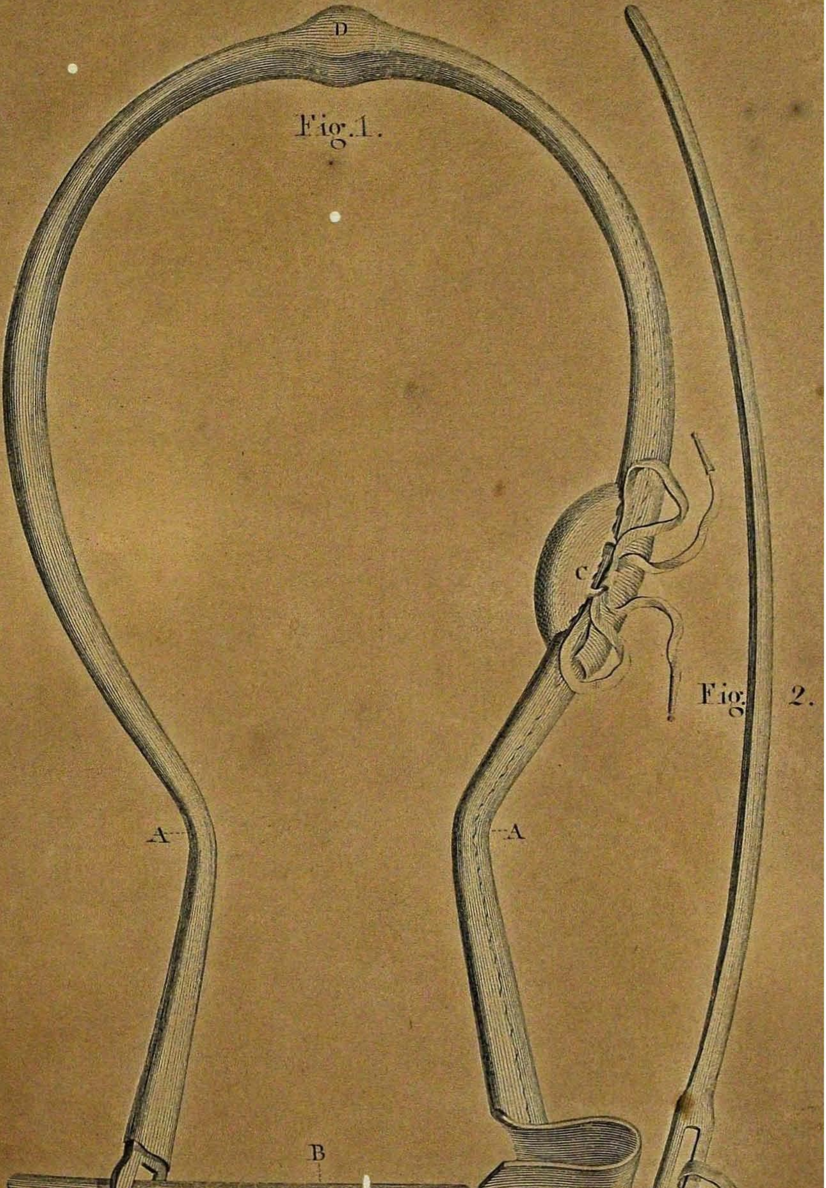


PLATE LV.



D Lizars Sculp

PLATE LVI.

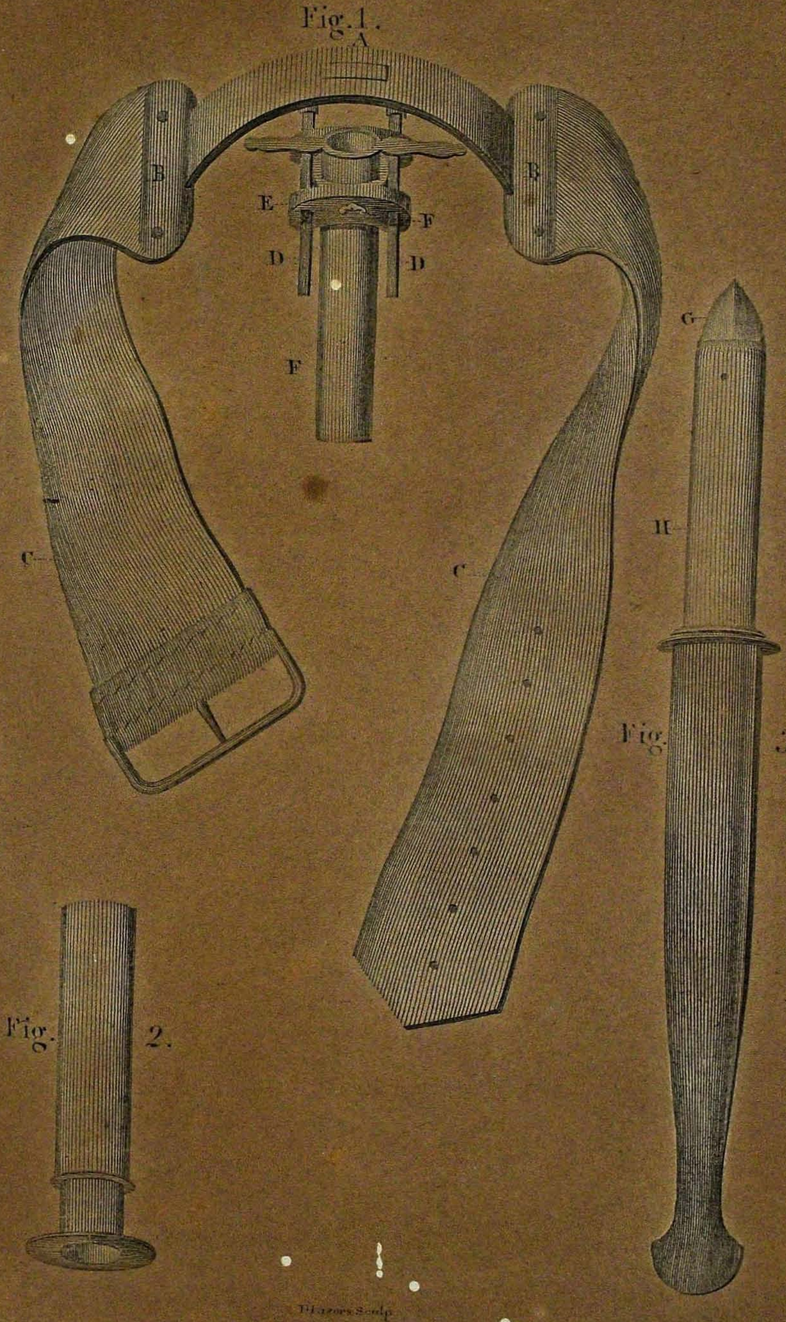


PLATE LVII.

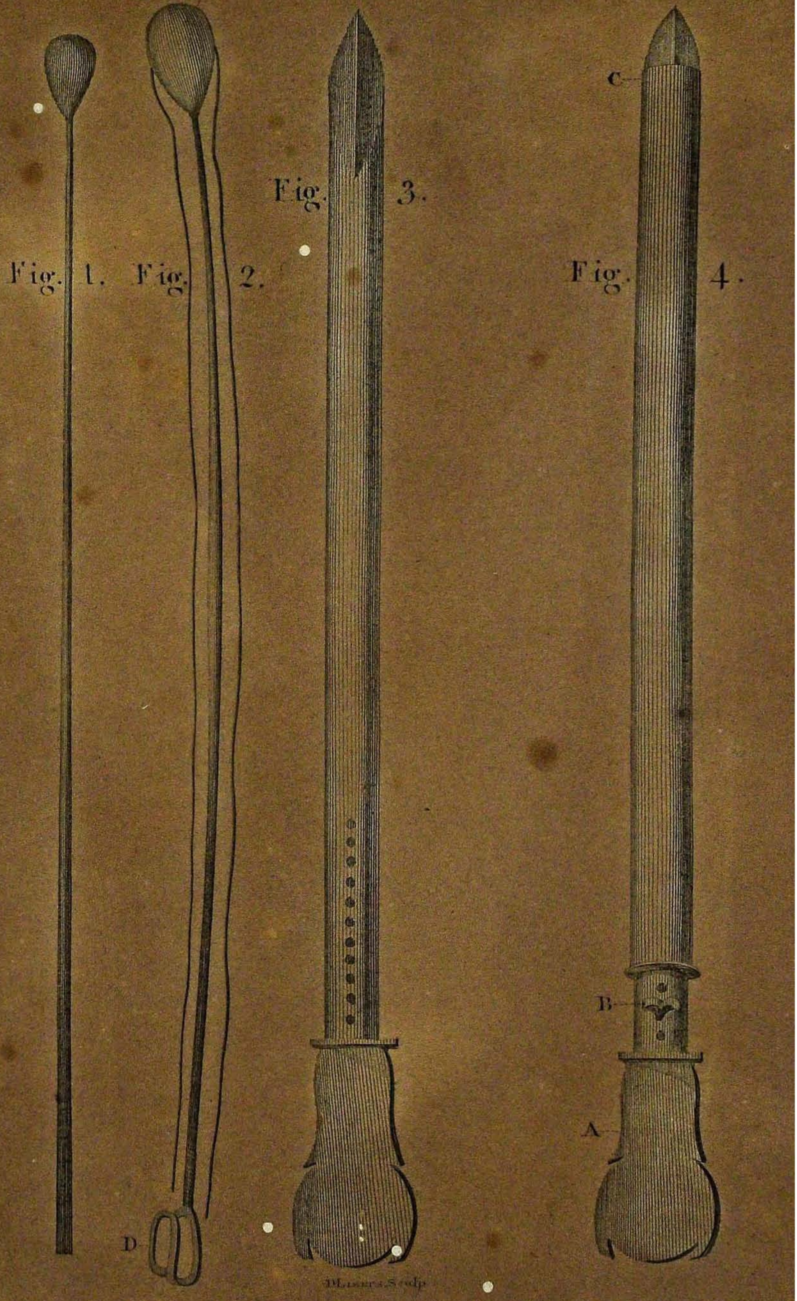


PLATE LVIII.

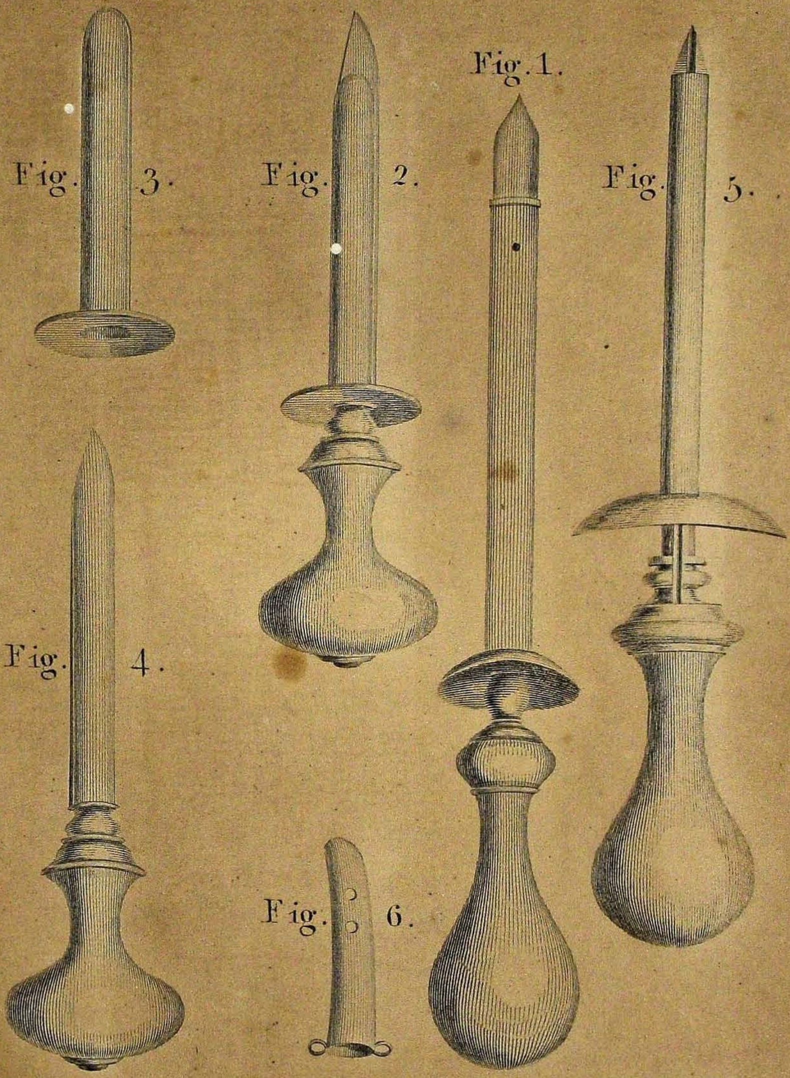


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PLATE LIX.

Fig. 1.

Fig. 2.

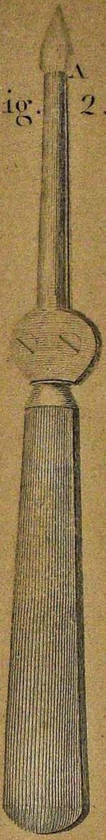


Fig. 3.

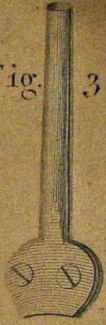


Fig. 4.

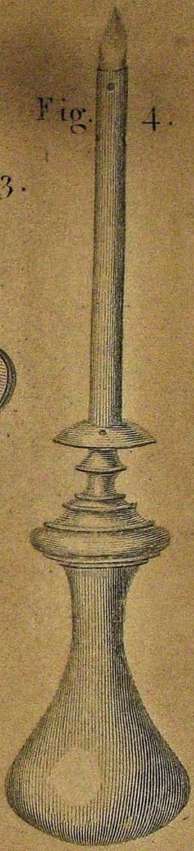


Fig. 5.

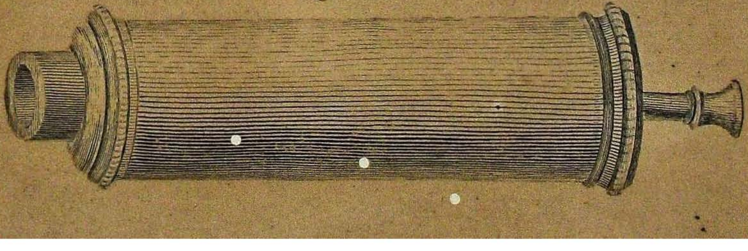


PLATE LX.

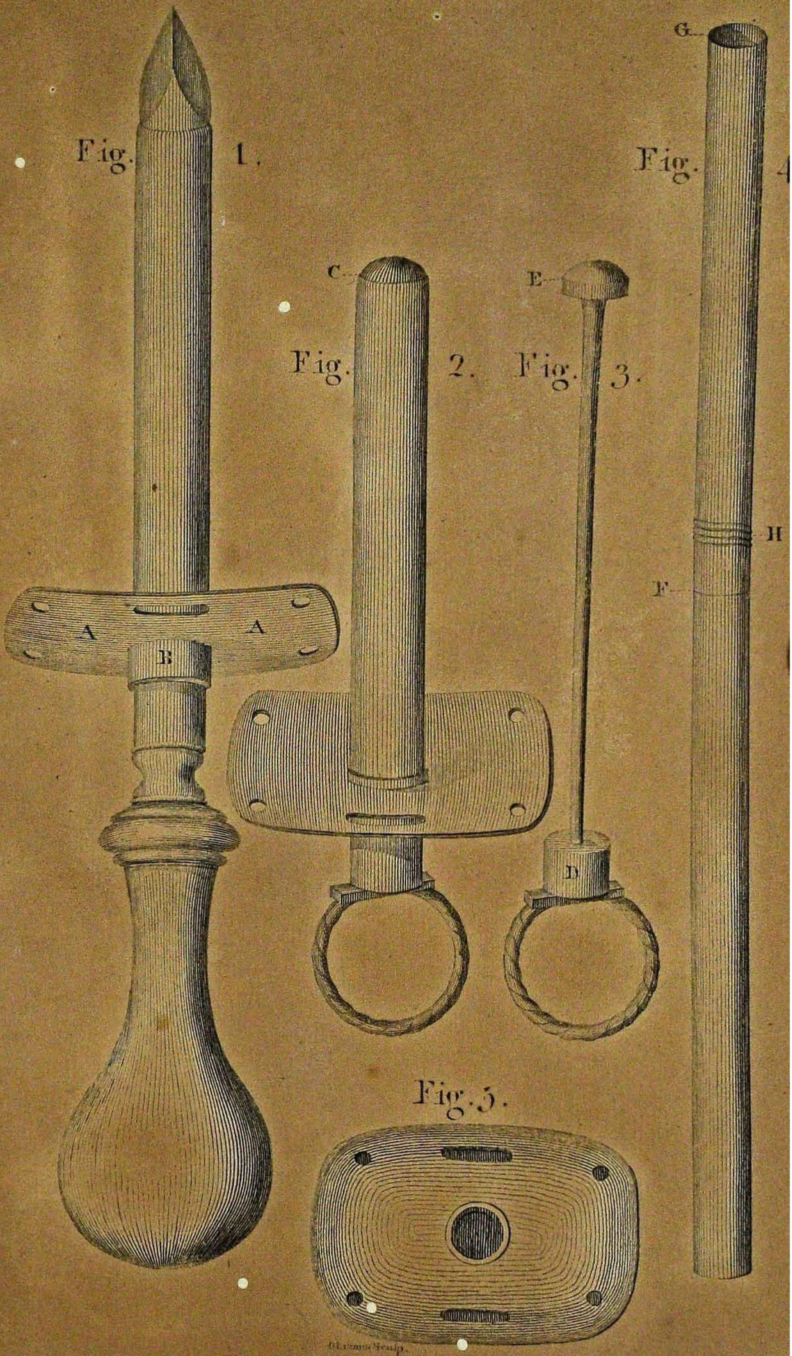
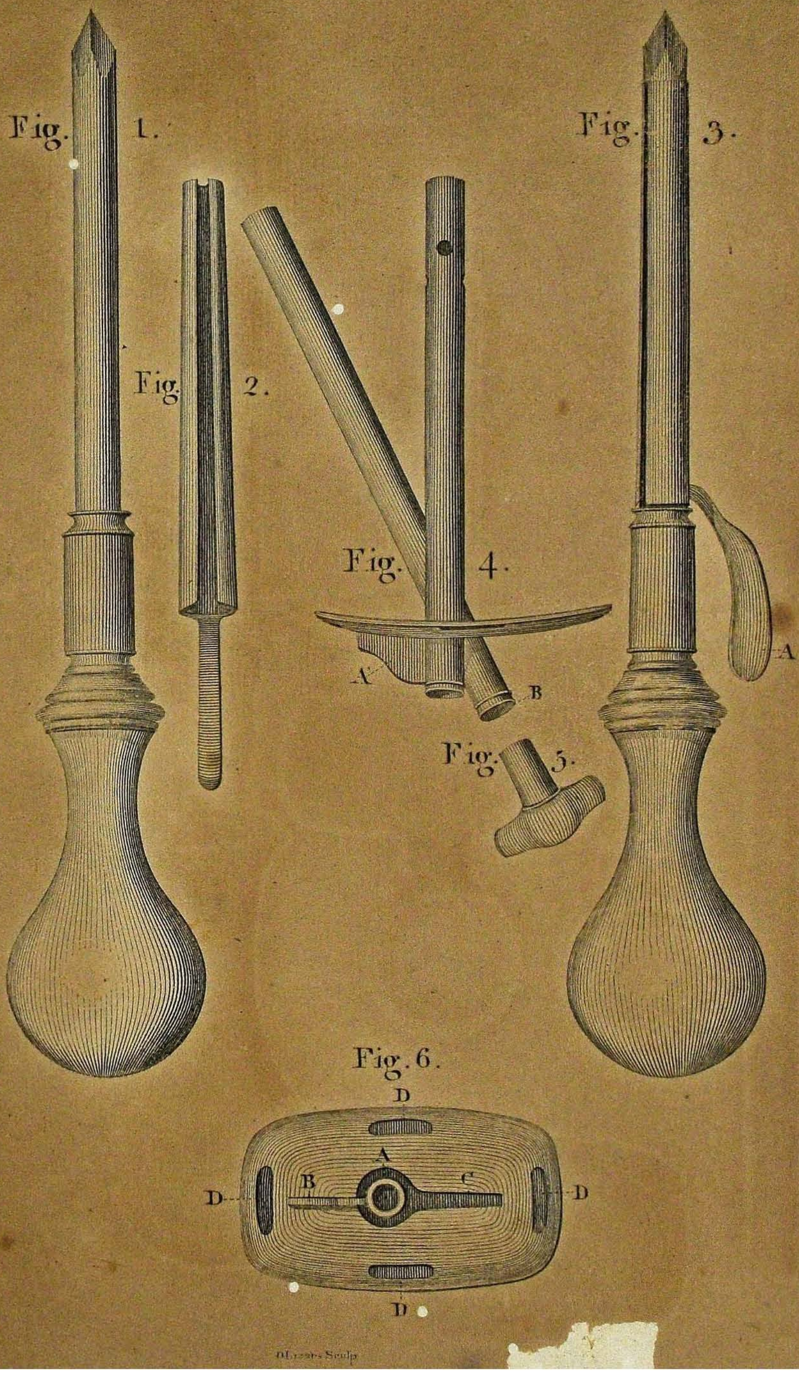


PLATE LXI.



D. Lizars Sculp

PLATE LXII.

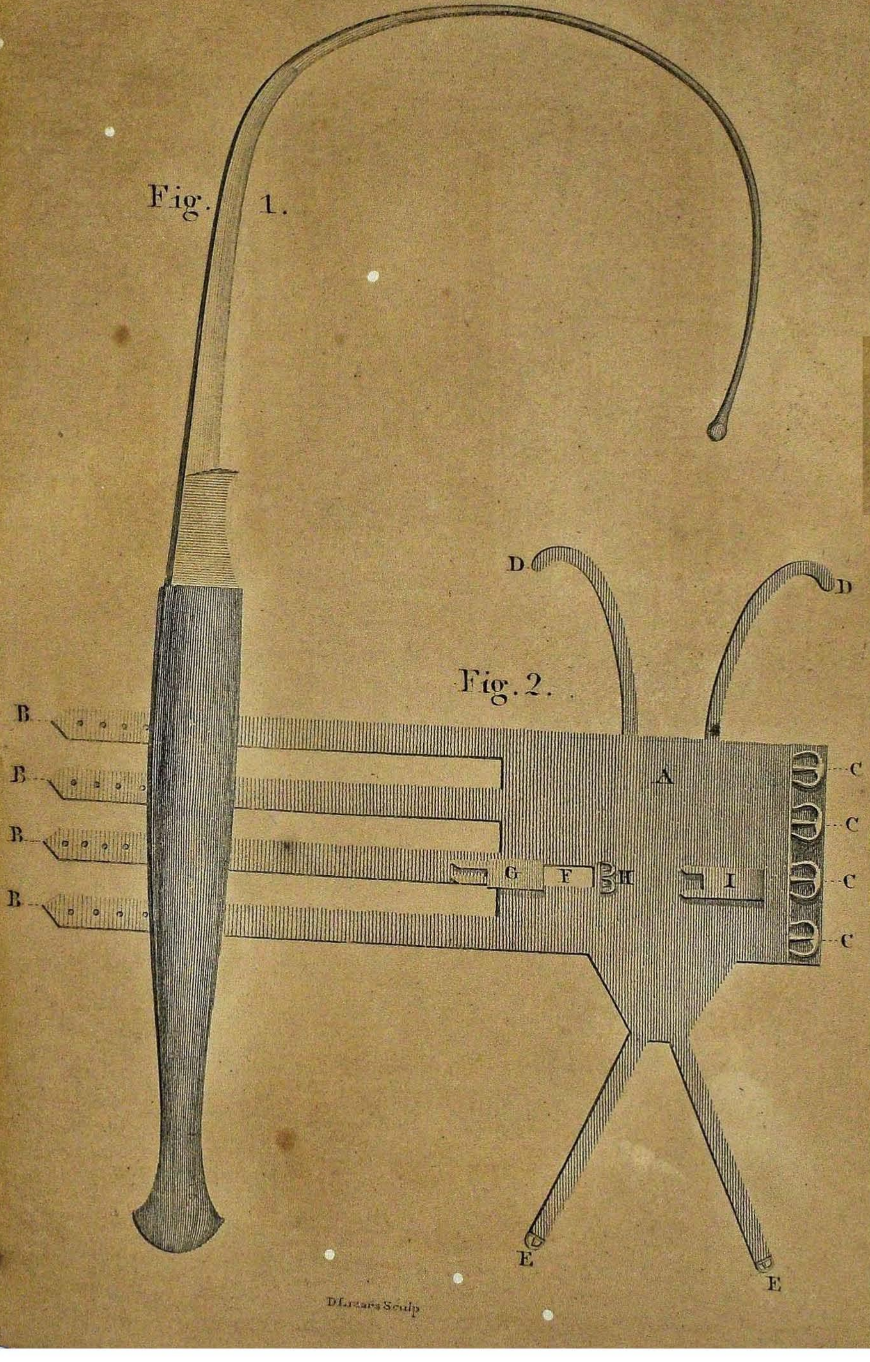


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PLATE LXIII.

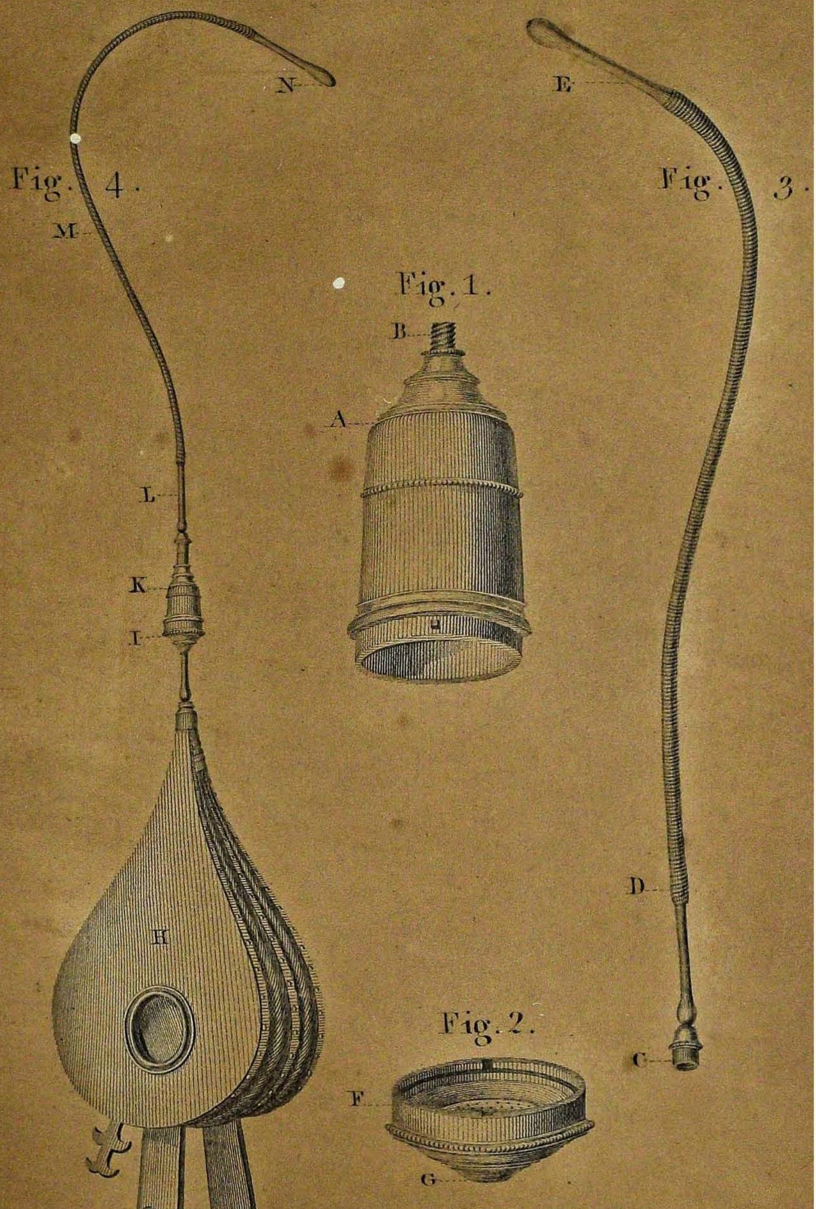

PLATE LXIV.

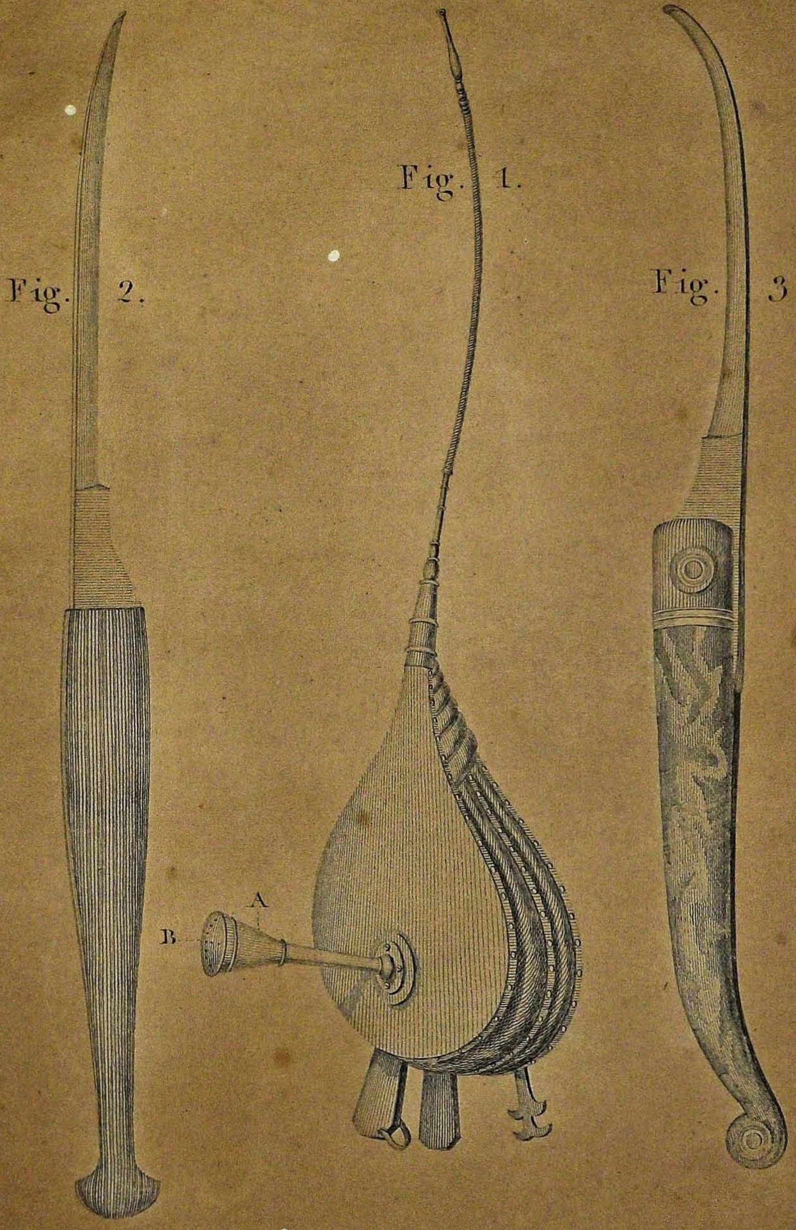

PLATE LXV.

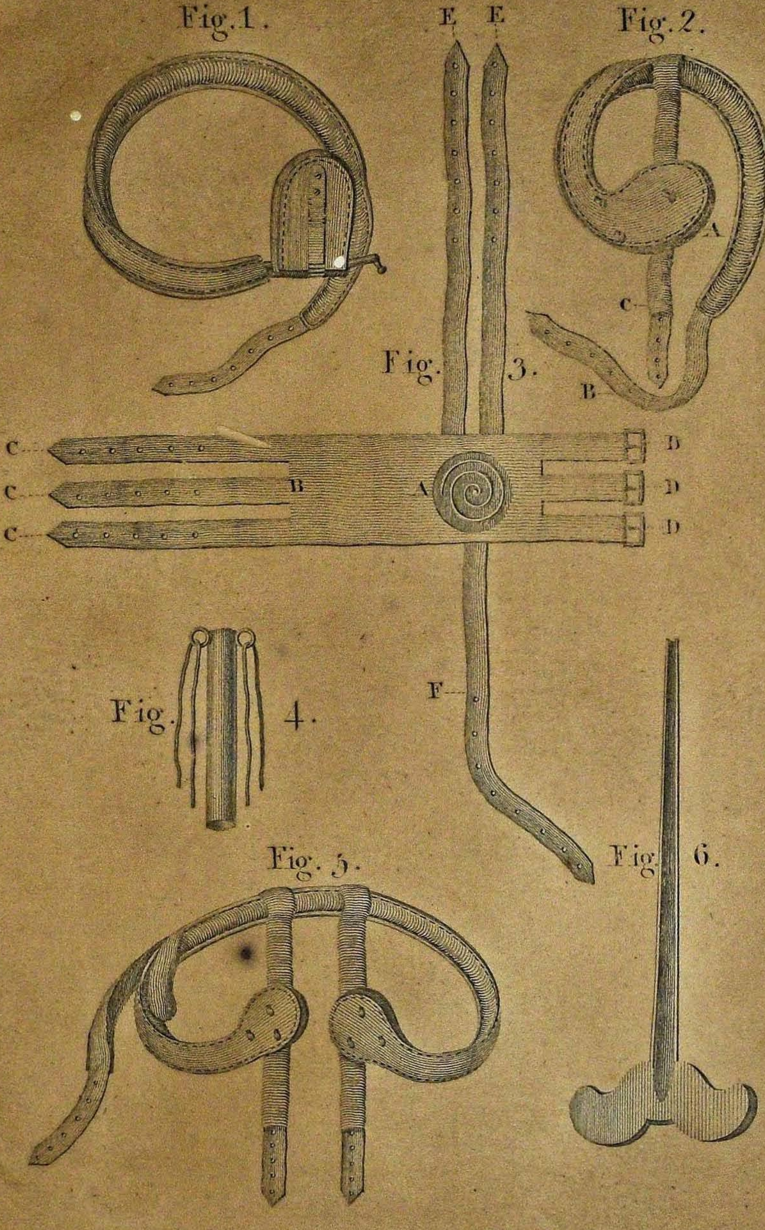

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PLATE LXVI.

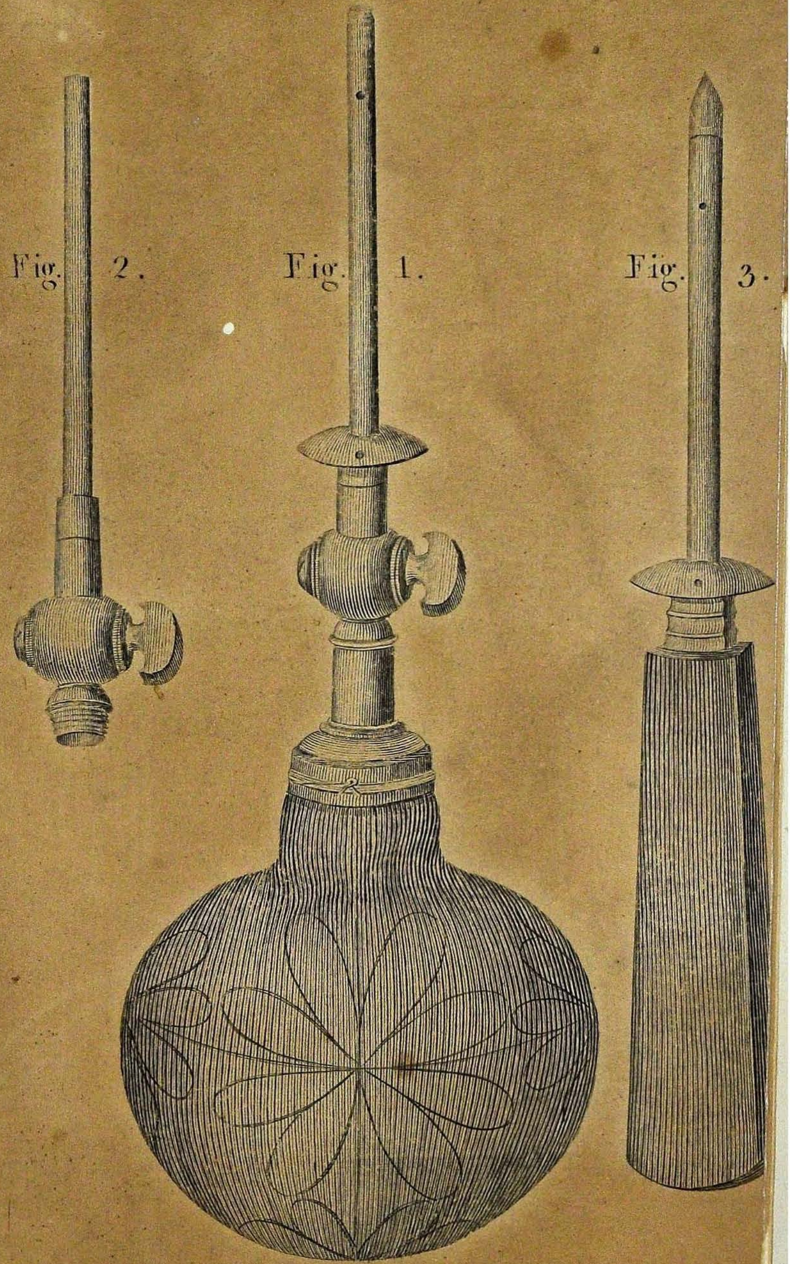

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PLATE LXVII.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

J. Lizars Sculp.